Series 1954, No. 3 Issued August 1959

SOIL SURVEY

Preston County West Virginia

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
WEST VIRGINIA AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Preston County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; aid foresters in managing woodlands; and add to the soil scientist's fund of knowledge.

In making this survey, soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, engineering, forestry, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then, cartographers prepared from the photographs the detailed soil map in the back of this report. Fields, woods, roads, and many other landmarks can be seen on the map.

Locating the soils

Use the index to map sheets to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map is found, it will be seen that boundaries of the soils are outlined, and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose, for example, an area located on the map has a symbol Gk. The legend for the detailed map shows that this symbol identifies Gilpin silt loam, 3 to 10 percent slopes. This soil and all the others mapped in the county are described in the section, Soil Descriptions.

Finding information

Few readers will be interested in all of the soil report, for it has special sections for different groups. The section, General Nature of the Area, will be of interest mainly to those not familiar with the county. It mentions climate and physiography and gives some statistics on agriculture.

Farmers and those who work with farmers can learn about the soils in the section, Soil Descriptions, and then turn to the section, Use, Management, and Estimated Yields. In this way they first identify the soils on their farm and then learn how these soils can be managed and what yields can be expected. The soils are placed in management groups; that is, groups of soils that need similar management and respond in about the same way. For example, in the section on soil descriptions, Gilpin silt loam, 3 to 10 percent slopes, is shown to be in management group 4. The management this soil needs therefore will be stated under the heading, Management Group 4, in the section, Use, Management, and Estimated Yields.

Foresters and others interested in management of woodlands can refer mostly to the section, Woodland and Its Management. In this section the types of forest are mentioned, the factors affecting their management are explained, and the soils in different woodland sites are described.

Engineers will want to refer to the section, Engineering Properties of the Soils. A table in that section shows the depth to bedrock, the texture of soil layers, drainage, and other characteristics of the soils that affect engineering.

Soil scientists will find information about how the soils were formed and how they were classified in the section, Genesis and Morphology of Soils.

Students, teachers, and other users will find information about the soils and their management in various parts of the report, depending on their particular interest.

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The survey was begun in 1945. This report was written in 1956 and, unless otherwise indicated, all statements in the report refer to conditions in the county at that time. This publication on the soil survey of Preston County, West Virginia, is part of the technical assistance furnished to the Monongahela Soil Conservation District.

U S GOVERNMENT PRINTING OFFICE. 1960

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D C.

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United States Department of Agriculture in cooperation with the West Virginia Agricultural Experiment Station

PRESTON COUNTY is part of a high plateau in the northeastern part of West Virginia (fig. 1). Mountains rise above the plateau, and streams have cut it deeply The total area of the county is approximately 645 square miles, or 412,800 acres, but only slightly more than half of this land is in farms. Most of the rest is covered by cutover hardwood forest.

The farms average near 111 acres in size. More than half of them are of the kind that produce mainly for the farm household or that are worked part time by an operator who has a job off the farm. Only about a fifth of the land on farms is used for cultivated crops. The acreage in permanent pasture, woodland pasture, and woodland accounts for more than two-thirds of the land in farms. The main crops are hay, corn, small grains, and buckwheat. The acreage in hay is greater than the combined acreage of the other crops named.

General Soil Areas

In mapping a county or other large tract, it is fairly easy to see definite differences as one travels from place to place. There are many obvious differences in shape, gradient, and length of slopes; in the course, depth, and speed of the streams; in the width of the bordering valleys; in kinds of native plants; and even in the kinds of agriculture. With these more obvious differences there are less easily noticed ones in the pattern of soils. The soils change along with the other parts of the environment.

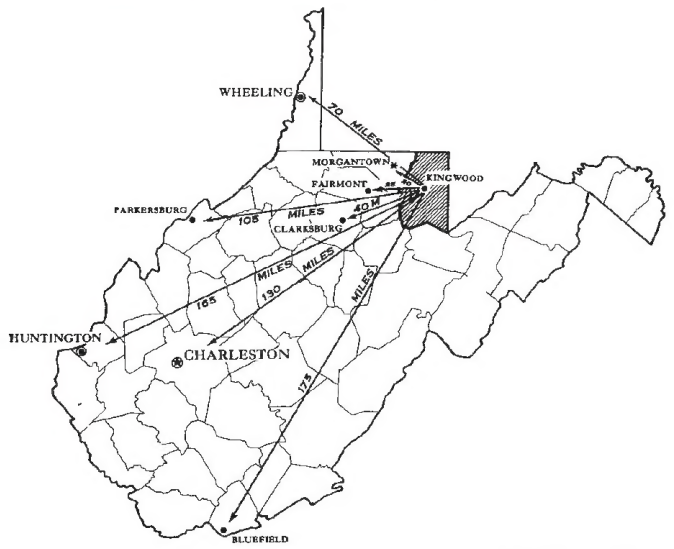

Figure 1.—Location of Preston County in West Virginia.

By drawing lines around the different patterns of soils on a small map, one may obtain a map of the general soil areas, or, as they are sometimes called, soil associations. Such a map is useful to those who want a general idea of the soils, who want to compare different parts of a county, or who want to locate large areas suitable for some particular kind of agriculture or other broad land use.

The six general soil areas, or kinds of soil patterns, in Preston County, are shown on the colored map at the back of this report. The areas are named for the major soil series in them, but soils of other series may be present in any of the areas. Also, the major soil series in one area may occur in other areas. The Gilpin–Rayne–Wharton area in the northern and western parts of the county and the Calvin–channery Gilpin area in the southeastern part of the county are the most important agricultural regions. The other soil areas are small but have distinct soil differences important to the farms within them.

Gilpin–Rayne–Wharton area.—The soils in this area were derived from acid sandstone, siltstone, and clay shale, principally of the Conemaugh and the Allegheny geologic series. Slopes are often steep and in many places rugged; nevertheless, the topography over a large part of the area is relatively smooth, particularly on the rounded hills and broad level ridgetops.

The dominant soils in this area are the moderately well drained Wharton and the somewhat poorly drained Cavode soils, which have heavy clay subsoils, and the well-drained Gilpin and Rayne soils. Associated with these upland soils are the Ernest, Brinkerton, and Lickdale soils on the lower slopes and the Pope, Philo, and Atkins soils on the narrow bottom lands. Small areas of other soils occur both on the uplands and on the terraces. The red clay Upshur soils occur only in the southwestern corner of the county. Soils of the Dekalb series also are present on some of the steep hillsides where the parent material is mainly massive sandstone.

The farms in this area (fig. 2) are mainly dairy, beef cattle, or general farms. Corn, small grains, and hay are grown, mostly to provide feed for livestock on the farms There are numerous strip mines in the area, and mine spoil is a typical part of the landscape Many farms have been abandoned because of the sale of stripping rights.

Calvin–channery Gilpin area.—Calvin silt loams and Gilpin channery silt loams are the dominant soils in the southeastern part of the county. They were derived from acid sandstone and shale of the Catskill, Mauch Chunk, and Chemung geologic series. Both the Calvin and Gilpin soils have stone fragments throughout their profiles. The southern part of this general area differs from the northern. In the southern part, the Calvin

and Gilpin soils are on steep slopes and extremely sharp ridges. In the northern part, these same soils are on gentle slopes and broad ridges. Associated with these soils of the uplands are the Ernest, Brinkerton, and Lickdale soils of the lower slopes and the Sequatchie, Pope, Philo, and Atkins soils of the narrow bottom lands.

The southern part of the Calvin–channery Gilpin area is largely woodland of variable quality.

Some of the best farms in the county are on moderately sloping soils near Terra Alta. In the northern part of the area, general farming is practiced. Corn, small grains, and hay crops are grown to supply feed for livestock on the farms. Buckwheat is sometimes grown for a cash crop or for feed. Most pastures are on steeper slopes; consequently, their productivity is low

This part of the county lies at higher elevations than other parts. Summers are short, winters are long and cold, and the amount of rainfall is greater.

Dekalb area.—This area is mountainous Briery Mountains, Laurel Ridge, Snaggy Mountain, Chestnut Ridge, and the Cheat River gorge are the prominent physiographic features. Sandstone ridgetops and steep, stony, side slopes marked by bedrock outcrops are common. Frequently the bedrock outcrops as narrow ledges.

Figure 2.—Farm in Gilpin–Rayne–Wharton soil area; stripcropping on Ernest and Brinkerton soils in foreground, pasture on Gilpin silt loams in background.

The most extensive soils in this area are those of the Dekalb series. These soils are shallow to moderately deep, coarse textured, often stony, and somewhat droughty. Associated with the Dekalb soils of the uplands are the Shelocta, Ernest, Brinkerton, and Lickdale soils of the lower slopes, and the Sequatchie, Pope, Philo, and Atkins soils of the bottom lands. Locally, other soils common to the uplands may occur, among which are soils of the Clymer, Cookport, Gilpin, and Wharton series.

About 85 percent of the Dekalb area is woodland. Most farms in the area are along the border of other soil areas or include soils that are more productive than the Dekalb soils. The farms all classify as general farms. Many of them are small, part-time farms that supply only a small part of the family income.

Belmont area.—Belmont soils are most extensive in this area. They were derived from red shales and limestone of the Mauch Chunk and Greenbrier geologic series and generally occupy gentle to steep slopes. In some localities they are on gentle slopes that lie between Dekalb soils and soils of the Calvin–channery Gilpin soil area. Associated with these upland soils are soils of the Clarksburg series (reddish variant) on the lower slopes and soils of the Melvin series on the narrow bottom lands.

The Belmont area occupies only a small proportion of the county, but the soils in this area are among the most fertile in the county. They are used mainly for pasture because slopes are too steep for cultivation and the growing season is short and cool. Farmers in the area grow a limited amount of row crops and of small grains for use on the farm.

Clymer area.—Soils of the Clymer series are most extensive in two small areas within the county, near Aurora and near Cranesville (fig. 3). In this general area Clymer soils occupy broad, gently sloping crests of ridges, where they are closely associated with the shallow to moderately deep stony Dekalb soils. The well-drained Clymer soils also are associated with the moderately well drained Cookport and the very poorly drained Lickdale soils

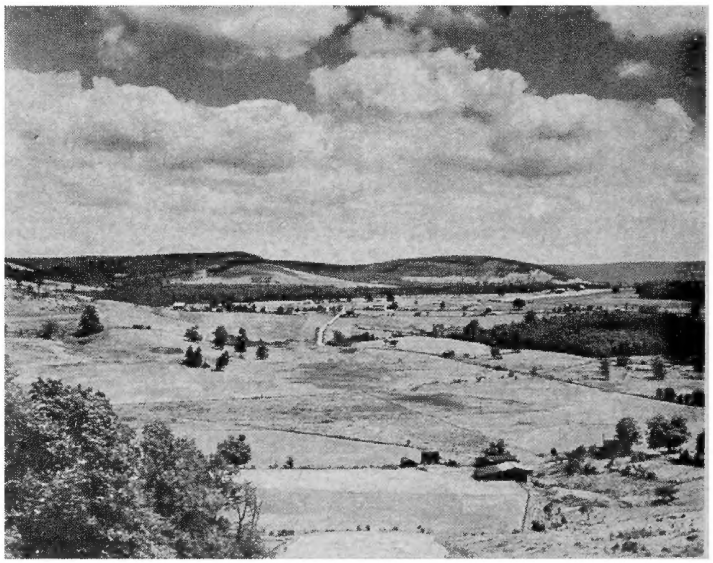

Figure 3.—Clymer soil area near Cranesville; Clymer soils in foreground; stony Dekalb soils capping low mountains; and Calvin and Belmont soils on hillsides between Dekalb and Clymer soils.

Most of the land in the Clymer soil area is tilled. The cool climate and the deep, well-drained soils are favorable for growing potatoes, an important crop in this area.

Atkins (glades) area.—This soil area consists of numerous small, poorly drained tracts, most of them near the heads of streams The soils are mainly of colluvial and alluvial origin. The most extensive soils are those of the Atkins series; however, Elkins soils, which have a dark-colored surface, are closely associated with the Atkins soils. Soils of the Brinkerton and Lickdale series normally occupy the outer fringes of glade areas.

Most glade areas are left idle and produce poor, brushy pasture. Some soils in the glade areas have been drained, limed, and fertilized and are producing good pastures and hay crops.

Use, Management, and Estimated Yields

This section has three main parts. The first groups the soils to show their relative suitability for farming, grazing, forestry, and wildlife.

The second part gives some principles of soil management that apply to all the soils in the county; then it discusses the use and management of the separate soil groups, called management groups.

The third part provides estimated yields of principal crops under two levels of management: The management ordinarily practiced, and the improved management that most farmers in the county would find it practical to follow.

Used together, the three parts form a basis for planning management of soils. The first part sets forth the broad limitations of the soils for agriculture, or, in other words, sets the safe limits for use of the soils. The second explains the kinds of practices that are needed to get the most out of various groups of soils without depleting them. The third, the yields under two levels of management, furnishes a yardstick by which farmers can partly judge their financial ability to undertake practices that will improve their soils

Capability Classification

The soils of Preston County have been grouped to show their suitability for crops, pasture, forest, and wildlife. This grouping is based on the uses that can be made of each soil, its needs for management, and the hazards of erosion or other damage when it is used. Since this is a practical grouping based on needs and responses, it can bring together, in one group, soils that were formed from different parent materials or in different ways.

There are eight general land capability classes, but all do not necessarily occur in a particular area. Class I land is nearly level and has few limitations; the soils are productive and not subject to erosion. In contrast, class VIII land has little or no useful vegetation because the soils are too rough or stony, too wet or droughty, or are limited in some other way.

Class I soils are at least fairly fertile and are not subject to more than slight erosion, drought, or wetness. They can be used for crops ordinarily grown in the locality without special practices, other than those needed for good farming anywhere. The farmer can choose one of several cropping systems or use the soil for pasture, trees, or other purposes.

Soils placed in class II and class III are subject to moderate or moderately severe erosion, are too wet or too droughty, or have other management needs that are successively greater than those of soils in class I. Soils in class IV have severe limitations when used for crops and are best suited to hay or pasture. Management needs and probable yields can vary on the different soils.

Soils not suitable for cultivation, or that require extreme management of any kind, including those subject to severe erosion if cultivated, are placed in classes V, VI, VII, or VIII. Class V contains soils that are nearly level and not subject to erosion, but they are too wet, too frequently overflowed, or too stony for cultivation. There are no class V soils in Preston County. Soils placed in class VI are steep, droughty, or shallow but have only moderate limitations or hazards if used for pasture or trees.

Soils in class VII are more limited than those in class VI. They are not suited for use as cropland and have very severe limitations when used for pasture. They are best suited for use as woodland.

Class VIII consists of soils so severely limited they are not suited to crops, pasture, or trees. They may have value for wildlife or as recreational areas. None of the soils in this report have been placed in class VIII, because the areas that could be placed in class VIII are too small to be shown on the map. These areas include river banks, rock outcrops, mine dumps, and the outer slopes of minespoil areas.

SUBCLASSES: Each of the eight classes contains soils that have limitations and management problems of about the same degree. The soils within a class may be of different kinds, however, and therefore the kinds of limitations are different. The dominant kind of limitation is indicated by one of three subclasses. The three subclasses indicate· Soil subject to erosion if cover is not maintained, designated by the symbol (e); excess water either on or in the soil (w); or shallow, droughty, or stony soil (s). Ordinarily, all the subclasses will not occur on a particular land class in an area the size of a county.

Classes, subclasses, and management groups

The capability classes, subclasses, and management groups in Preston County are defined in the list that follows. The management groups, numbered consecutively from 1 through 31, are equivalent to capability units. Therefore, in parentheses following each management group is the symbol used in the West Virginia system of identifying capability units.

Class I.—Soils suitable for intensive cultivation without special practices to control runoff or erosion, and that may be expected to produce high yields under good management.

- Management group 1 (I–4): Nearly level, well-drained soils of the uplands
- Management group 2 (I–6): Nearly level, well-drained soils of the bottom lands.

Class II.—Soils that can be used for tilled crops with moderate risk of erosion or that have other moderate limitations.

IIe: Gently sloping soils limited by moderate hazard of erosion.

- Management group 3 (IIe–4): Deep loamy soils from acid sandstones and shales.
- Management group 4 (IIe–10): Shallow to moderately deep loamy soils from acid sandstones, siltstones, and shales; somewhat droughty.
- Management group 5 (IIe–11): Deep loamy soils from interbedded calcareous shales, sandstone, and limestone.
- Management group 6 (IIe–12): Shallow to moderately deep loamy soils from acid sandstone; somewhat droughty.
- Management group 7 (IIe–13): Deep loamy soils from acid sandstones and shales; contain fragipan or claypan layers.

Management group 8 (IIe–14): Deep loamy soils from calcareous colluvial material; contain compact and slowly permeable lower subsoil.

IIw: Nearly level soils limited by excess wetness.

Management group 9 (IIw–7): Soils of the bottom land that are somewhat poorly drained and subject to seasonal overflow.

IIs: Nearly level and gently sloping soils limited by droughtiness.

Management group 10 (IIs–2): Sandy soils along streams that dry out excessively during dry seasons.

Class III.—Soils that can be tilled only with moderately severe risk of erosion or that have other moderately severe limitations.

IIIe: Gently sloping and strongly sloping soils that are limited by severe erosion or by moderately severe risk of erosion; intensive conservation practices needed to prevent erosion.

Management group 11 (IIIe–4): Deep loamy soils from acid sandstones and shales.

Management group 12 (IIIe–10): Shallow to moderately deep loamy soils from acid sandstones, siltstones, and shales; somewhat droughty.

Management group 13 (IIIe–11): Deep loamy soils from interbedded calcareous shales, sandstone, and limestone.

Management group 14 (IIIe–12): Shallow to moderately deep loamy soils from acid sandstone; somewhat droughty.

Management group 15 (IIIe–13): Deep loamy soils from acid sandstones and shales; contain fragipan or claypan layers.

Management group 16 (IIIe–14): Deep loamy soils from calcareous colluvial material; contain compact and slowly permeable lower subsoil.

Management group 17 (IIIe–15): Deep, heavy-textured soils from slightly calcareous clay shales.

IIIw: Nearly level to gently sloping soils that are limited by excess wetness.

Management group 18 (IIIw–1): Flat or nearly level soils along stream bottoms; often wet because of stream overflow.

Management group 19 (IIIw–5): Nearly level to gently sloping soils; wet because of poorly drained claypan subsoil.

Class IV.—Soils that have severe limitations or that are subject to high risk of damage when used for tilled crops. Soils in this class are best suited to long-term hay crops and permanent pasture.

IVe. Gently sloping to moderately steep soils severely eroded or subject to severe erosion; should be tilled only when it is necessary to reseed hay or pasture.

Management group 20 (IVe–3). Shallow to moderately deep soil from acid sandstone and shale.

Management group 21 (IVe–9): Moderately deep to deep loamy soils from acid shale and sandstone materials and having a claypan subsoil.

Management group 22 (IVe–11): Shallow to moderately deep soils from calcareous shales and interbedded sandstone and limestone materials.

Management group 23 (IVe–15): Deep, heavy-textured soils from slightly calcareous clay shales.

IVw: Nearly level to gently sloping soils limited by excess wetness.

Management group 24 (IVw–1): Soils that have poor natural drainage, mainly in or associated with glade areas.

Class VI.—Soils that are steep, stony, or otherwise not suited to cultivation, but suited to pasture and trees with moderate restrictions in use.

VIe: Soils that are steep, shallow, and subject to severe erosion.

Management group 25 (VIe–2): Soils developed from acid shales and sandstone.

Management group 26 (VIe–3): Soils developed from calcareous shales and interbedded sandstone and limestone materials.

VIs: Soils that are gently sloping to moderately steep but limited by stoniness.

Management group 27 (VIs–1): Well-drained soils derived from calcareous materials.

Management group 28 (VIs–2): Moderately well drained to poorly drained soils derived from acid materials.

Class VII.—Soils that are not suitable for cultivation and severely limited when used as pasture; best suited to trees.

VIIe: Soils that are too steep, stony, shallow, or eroded for use as cropland or pasture.

Management group 29 (VIIe–1): Steep or very steep, stony soils.

Management group 30 (VIIe–2): Steep or very steep, shallow or moderately deep soils.

Management group 31 (VIIe–3): Steep or very steep, severely eroded soils.

Use and Management of Soils

Some problems of management are common to all the soils of Preston County; others are common to only certain groups of soils. To simplify discussion, some aspects of management that apply to all the soils are mentioned first. Then the problems that apply to groups of soils, that is, the management groups, are considered.

You may find that you need assistance in planning management of your soils. Your local representative of the Soil Conservation Service, the county agent, the local vocational agriculture instructor, and the State Agricultural Experiment Station can help you determine the best use and management for the soils on your farm.

General principles of management

The following general principles of management apply to all soils in the county. Use them with the detailed suggestions for management given under the heading, Management Groups.

1. Do not use a soil beyond its capability. A class IV soil certainly will be damaged if it is used for row crops as frequently as a soil in class I or II. Actually, it is better to use a soil at less than its maximum capability. To illustrate, if a class III soil is not needed for row crops, use it for hay, pasture, or trees.

2. Use a crop rotation that will improve the structure of the soil and increase its productivity. In Preston

County, all crop rotations should have at least one year of a sod-forming crop, and the sod crop should contain a legume.

3. Apply fertilizer and lime in the amounts needed to get the best yields the soil is capable of producing. It costs almost as much in labor and money to produce a poor crop as a good one. If you need advice on testing soils and applying fertilizer, talk to your county agent or the local representative of the Soil Conservation Service.

Most of the soils in Preston County are deficient in plant nutrients. Nearly all of them are short in phosphorus, and the soils that contain a lot of clay particularly need this element.

Potassium is deficient in many of the light sandy soils and the silty soils on gentle slopes. Among the soils short in potassium are those of the Clymer, Cookport, Rayne, and Monongahela series. These same soils may need boron if alfalfa is grown on them.

All the soils are short in nitrogen, unless legumes have been grown on them regularly and manure has been used abundantly.

All the soils need lime because they have acid surface layers. Fertilizer will not give full benefit if it is applied to an acid soil, nor will legumes make the kind of growth that will build up or maintain the supply of organic matter. Test the soils and apply lime in the amounts shown necessary by the tests.

4. Plant a cover crop after a row crop to protect the soil from erosion during winter. Plow under the cover crop before planting again, for it will improve tilth.

5. Apply manure to cropland, particularly to the soils that are on slopes or that are severely eroded.

6. Do not put too many animals on the pasture or keep them there too long. Overgrazing weakens the sod and exposes the soil to erosion. Pastures that contain bluegrass are particularly susceptible to overgrazing during summer. The bluegrass is almost dormant in hot, dry weather. Orchardgrass or bromegrass and suitable legumes make productive pastures but need careful management.

Management groups

The soils of Preston County have been placed in 31 management groups. The soils in a given group have about the same limitations and risks of damage, need about the same management, and respond to that management in about the same way. In the following pages each group is described, the soils in it are named, and management for the group is suggested.

MANAGEMENT GROUP 1 (I-4)

This management group contains only one soil, Clymer loam, 0 to 3 percent slopes. This is a deep, well-drained, nearly level loamy soil. It is moderately permeable, holds moisture well, is easy to work, and can be used intensively if practices ordinary in good farming are applied. The soil is strongly acid throughout the profile and has only fair natural fertility. Nevertheless, if lime and fertilizer are added, the soil is productive of all the crops grown in the area. It is a particularly good soil for potatoes.

TILLED CROPS: A crop rotation that includes a grass-legume hay crop at least 1 year in every 3 years is desirable. After a row crop, the soil needs the protection of a cover crop the following winter. Suitable cover crops are rye, ryegrass, vetch, or winter wheat. Tilth and organic content can be improved by working crop residues into the soil. Except for potatoes, sufficient lime ought to be added to bring the pH value of the soil to between 6.5 and 7.0. Fertilizer will be needed to obtain high yields. This soil is likely to be low in potassium.

LONG-TERM HAY: Fertilize well and seed a grass-legume mixture such as alfalfa and timothy, orchardgrass, or bromegrass. Clovers normally do not last more than 1 or 2 years. Meadows need a topdressing every year. Alfalfa-grass mixtures will require plenty of potash. Reseed when the legume begins to die out.

PASTURE: Tall grasses, deep-rooted grasses, and legumes produce more forage than the so-called bluegrass, or permanent, pastures. If mixtures of tall grasses and legumes are fertilized well and carefully managed, they will remain productive. Lime ought to be added to keep the pH value at about 6.5 for tall-grass pastures and at 6.0 for permanent pastures. Clipping of pastures will control weeds and other rank growth. Livestock ought not be grazed in any tall-grass area for more than a few days at a time.

MANAGEMENT GROUP 2 (I-6)

In this group are deep, well-drained, silt loam soils of the bottom lands. They occur on slopes of 0 to 6 percent, are strongly acid, and in some places are occasionally flooded by streams. These limitations do not severely restrict their use. The soils hold moisture well, are naturally fertile, and can be used intensively if they are carefully managed. They are well suited to all the crops grown in the area and are good soils for pasture. The soils in this group are:

Pope gravelly silt loam.
Pope silt loam.

TILLED CROPS: These soils can be used intensively if adequately fertilized, but a hay crop is needed at least 1 year in every 4 or 5. The tilth of the soils can be improved by providing winter cover crops and turning under crop residues. Drainageways can be protected by keeping them in sod. Seep spots or wet areas may require drainage by tile lines or open ditches.

LONG-TERM HAY: Alfalfa-grass mixtures provide very good yields if properly managed. A phosphate-potash fertilizer ought to be applied to such meadows every year.

PASTURE: These are excellent soils for pasture, especially for mixtures of Ladino clover and grass. Mixtures of tall grasses and legumes need a topdressing of phosphate and potash every year and enough lime to bring the pH value to between 6 5 and 7.0 Permanent pastures require a pH value between 6.0 and 6.5. Pastures ought to be grazed uniformly to permit grass to recover and mowed to control weeds and rank growth.

MANAGEMENT GROUP 3 (IIe-4)

This group consists of deep, loamy, well-drained soils on gentle slopes. They hold moisture well but require contour stripcropping or other fairly simple practices to control erosion. The soils are deficient in phosphorus and potassium and may need boron if alfalfa is grown. They are well suited to potatoes.

Fairly large areas of these soils are near Cranesville and Aurora, and scattered areas are in most parts of the county. The soils in this unit are:

Clymer gravelly loam, 3 to 10 percent slopes.
Clymer loam, 3 to 10 percent slopes.

Rayne silt loam, 3 to 10 percent slopes.
Shelocta silt loam, 3 to 10 percent slopes.

TILLED CROPS: The crop rotation used ought to provide at least 1 year of grass-legume hay for every 2 years of soil-depleting crops. Contour stripcropping is needed, and cover crops should be grown following row crops. Natural waterways are best left in sod. Crop litter will improve tilth if it is worked into the soil.

These soils need plenty of fertilizer, but the resulting increase in yield normally will offset the additional cost. Lime enough to bring the pH to 6.5 or 7.0 is needed.

LONG-TERM HAY. These soils produce best if they are fertilized in amounts indicated by soil tests and seeded to long-term mixtures of alfalfa and timothy, orchardgrass, or bromegrass. The field ought to be reseeded before the legume dies out of the stand. Clover can be used instead of alfalfa, but it will not last more than 1 or 2 years. Meadows will provide better yields if topdressed every year with fertilizer.

PASTURE: If they are fertilized and otherwise well managed, pastures seeded to tall grasses and legumes will furnish more feed than the permanent pastures made up of native grasses. Tall grasses ought to be grazed only a few days at a time. Clipping will control weeds and rank growth The tall-grass pastures need lime enough to bring the pH of the soil to 6.5 or 7.0 The pH for the permanent grass pastures ought to be from 6.0 to 6.5.

MANAGEMENT GROUP 4 (IIe-10)

In management group 4 are moderately deep, well-drained soils that overlie acid sandstone and shale. They are gently sloping and easy to work, but serious sheet and rill erosion will start if runoff is not controlled. The soils tend to be droughty in dry weather. This is not serious, because droughts seldom occur in the county. The soils readily respond to fertilizer and will produce good yields of the crops ordinarily grown. This group of soils occupies about 25,000 acres and is important to the agriculture of the county. The soils are the following:

Calvin silt loam, 3 to 10 percent slopes
Gilpin channery silt loam, 3 to 10 percent slopes.
Gilpin silt loam, 3 to 10 percent slopes.

TILLED CROPS: Sloping areas need to be farmed on the contour, and if slopes are long, stripcropped on the contour. A rotation that provides at least 1 year of legume-grass hay for every 2 years of soil-depleting crops is required. A rotation made up of corn, a small grain, and 2 or 3 years of hay is commonly used. Either 2 or 3 years of legume-grass sod is better than 1 year because it furnishes greater protection from erosion and supplies more organic matter for improvement of tilth.

If the draws are left in sod, they will serve as waterways. Planting a cover crop after every row crop is a good way of protecting the soils in winter. Ryegrass, vetch, rye, or wheat are suitable cover crops. If plowed under, cover crops and crop residues will improve tilth.

For best yields, the soils need fertilizer and enough lime to bring their pH to 6.5 or 7.0.

LONG-TERM HAY: Lime and fertilizer ought to be applied according to soil tests. Suitable for long-term hay is a legume-grass mixture, as for example, alfalfa with timothy, with bromegrass, or with orchardgrass. A yearly topdressing of phosphate-potash fertilizer is needed to get good yields and a lasting stand. Seeding and reseeding the meadows on the contour will help control erosion.

PASTURE: Soils of this management group are a bit dry for permanent pastures made up of shallow-rooted grasses. They will grow good tall-grass pasture. Grazing needs to be rotated on tall-grass pastures to allow the plants plenty of time to recover. Fertilizer and lime ought to be applied according to needs shown by soil tests. These strongly acid soils need lime in quantities that will bring their pH to 6.5 or 7.0 for the tall grasses, and to 6.0 to 6 5 for permanent pasture. The soils are low in phosphorus and also in potassium. The tall-grass pastures need phosphate and potash fertilizer every year.

MANAGEMENT GROUP 5 (IIe-11)

Management group 5 contains one soil—Belmont silt loam, 3 to 10 percent slopes. This reddish, gently sloping, well-drained, easily worked soil is one of the best upland soils in the county. It was derived from parent materials influenced by limestone or limy shale. There was not enough lime in the parent material to keep the soil from being acid near the surface. It needs lime.

The soil erodes rather easily if not protected, but it will produce good yields of all crops if it is well managed. It is particularly good for alfalfa and pasture. This soil occurs in the eastern part of the county; its total area is 550 acres.

TILLED CROPS: On slopes less than 100 feet from top to bottom, erosion can be controlled by farming on the contour with suitable rotations If slopes are longer, stripcropping on the contour is needed. A cover crop will protect the soil in winter. Stubble and cover crops worked into the soil will improve tilth and control erosion. The natural waterways will not become gullies if they are left in sod.

A suitable rotation will keep the soil in hay half the time; that is, 2 years of hay in a 4-year rotation. A good rotation is the one commonly used in the county—a row crop, a small grain, and 2 or 3 years of hay.

The need for lime and fertilizer can be determined by soil tests. For tilled crops, the pH of the soil ought to be 6.5 or 7.0.

LONG–TERM HAY: This is a good soil for hay, particularly for mixtures of alfalfa and grass. Fertilizer and enough lime to bring the pH to 6.5 or 7.0 will be needed. The meadows provide good pasture after the hay has been harvested. Clover lasts only 1 or 2 years; alfalfa lasts longer.

PASTURE: A pasture made up of bluegrass and white-clover does well, but a well managed mixture of tall grasses and legumes will produce more forage. A pH of 6.5 is needed for the tall grasses, and a pH of at least 6.0 for the bluegrass pastures. Fertilizer is needed in amounts shown by soil tests.

Pastures can be clipped to control weeds and rank growth. Early in spring and late in fall the sod is soft and easily damaged by trampling, so the animals ought to be moved from one pasture to another to give the grass time to recover.

MANAGEMENT GROUP 6 (IIe-12)

In management group 6 are light, loamy or sandy soils that formed from sandstone. They are the following:

Dekalb channery sandy loam, 3 to 10 percent slopes.
Dekalb loam, 3 to 10 percent slopes.

These well-drained, slightly droughty soils warm up early in spring They are gently sloping and not highly erodible Nevertheless, serious losses of surface soil can occur if the soils are not protected. Angular and rounded sandstone fragments are scattered on the surface and throughout the soils, but they are not a serious obstacle to farming The soils are below average in natural fertility but respond readily to good management. They need lime because they are very acid.

TILLED CROPS: Loss of soil material can be checked by planting in contour strips and rotating crops A good rotation consists of a row crop, a small grain, and hay for 2 or 3 years. If necessary a shorter rotation made up of a row crop, a small grain, and 1 year of hay can be used. These soils are good for potatoes. Gullying can be controlled by leaving the natural depressions in sod.

Organic matter does not last long in these light soils, but the supply can be maintained or built up by planting winter cover crops after clean-tilled crops. If crop residues are worked into the surface soil, they will help to maintain the supply of organic matter and to control erosion. For best yields apply enough lime to bring the pH to 6.5 and add fertilizer in amounts shown necessary by soil tests.

LONG-TERM HAY: These soils will produce good yields of hay if they are seeded to an alfalfa-grass mixture and fertilizer is applied at the time of seeding Soil tests will show the quantities of lime and fertilizer needed. The pH of the soils needs to be brought to 6.5. The hay meadows need to be topdressed every year after the hay is harvested. If grazing is carefully managed, these meadows will provide lots of forage after the hay crop is cut.

PASTURE: The soils of this management group are a little droughty for bluegrass pastures. They will produce more forage if they are seeded to tall grasses that can be harvested for pasture or hay. Soil tests will determine the quantities of lime and fertilizer to be added. If the livestock are moved from one pasture to another, the tall grasses will have a chance to recover. Clipping is necessary to control weeds and to remove the rank uneaten clumps of grass.

MANAGEMENT GROUP 7 (IIe-13)

The soils of this management group are moderately well drained and acid throughout. They have a tight claypan or siltpan, called a hardpan by many farmers, at depths ranging from about 20 to 30 inches. Slopes are gentle. The soils are:

Cookport silt loam, 3 to 10 percent slopes.
Ernest silt loam, 3 to 10 percent slopes.
Monongahela silt loam, 0 to 10 percent slopes.
Wharton silt loam, 3 to 10 percent slopes.

The upper layers of these soils are well drained, but water moves very slowly through the pan. During wet periods, particularly in spring, water accumulates on top of the pan. As a result, the soils are poorly aerated. Water held above the pan may cause winter heaving of alfalfa and other deep-rooted crops. Many areas, particularly areas of the Ernest soil, lie at the base of long slopes and receive surface water from the adjacent hillsides. Wet-weather seeps are numerous in the Ernest and Wharton soils.

TILLED CROPS: If well managed, these soils will produce good yields of the crops commonly grown. They are poor for potatoes because they have a heavy subsoil.

Erosion can be controlled by farming the soils in contour strips, rotating crops, and leaving waterways in sod. A rotation that keeps the soils in sod half the time is desirable. In places, diversion ditches are needed to cut off water on adjacent hillsides This will help to dry up seepy spots, which may need additional drainage. Crop litter, worked into the surface soil, will build up the supply of organic matter, keep the soil from puddling, and help to control erosion. These soils, in most places, are low in phosphorus, and the Cookport and Monongahela, in particular, are normally low in potassium. Lime and fertilizer are to be applied in amounts shown necessary by soil tests and in the manner recommended by the State experiment station. For tilled crops, the pH ought to be brought to 6.5.

LONG-TERM HAY: It may be difficult to keep a long-lived legume on these soils, but a mixture of alfalfa and grass generally grows fairly well if lime and fertilizer are applied in amounts shown necessary by soil tests at the time the alfalfa-grass mixture is seeded. The hay mixture will need a topdressing of phosphate-potash fertilizer every year.

Ladino clover will grow in the wet spots that otherwise might be bare, and it is especially good if the meadow is to be grazed after the first crop of hay is cut.

PASTURE: These are good soils for pasture and present fewer problems if they are used for pasture rather than tilled crops. They hold moisture well, and bluegrass pastures do not burn so badly on these soils as on some of the drier soils. Ladino clover, sown with orchardgrass or a similar tall grass, does very well on these soils if it is managed intensively. For bluegrass pastures, the soils need enough lime to bring their pH to 6.0; tall-grass pastures ought to be limed to bring the pH to 6.5. The pastures need systematic topdressing. Tall-grass mixtures require phosphate and potash, bluegrass pastures are sure to need phosphate, and they may need potash.

Weeds and other rank growth can be controlled by clipping the pastures. If the pastures are seeded on the contour, they will provide more protection from erosion. Pastures ought to be reseeded when the legume begins to die out.

MANAGEMENT GROUP 8 (IIe-14)

Clarksburg silt loam, reddish variant, 3 to 10 percent slopes, is the only soil in this management group. It is similar to soils of group 7, particularly in hazard of erosion and in slow internal drainage. The soil developed from material containing some lime and therefore is more productive than the soils in group 7. For suggestions on use and management, see management group 7.

MANAGEMENT GROUP 9 (IIw-7)

Philo silt loam, the only soil in this group, is a deep, moderately well drained to somewhat poorly drained, nearly level soil of the bottom lands. Many areas are overflowed, some of them as often as once or twice a year. Most areas are flooded about once in 10 or 12 years, but a few lie high enough above the stream that they are not flooded. This soil has good natural fertility, but the lower part of its subsoil is often waterlogged and poorly aerated during winter and early in spring.

TILLED CROPS: This soil will produce crops that can stand some seasonal wetness, particularly wetness in winter and early in spring. Tile or open-ditch drains work well and will do much to correct the seasonal wetness

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in the deeper layers. Artificial drainage is particularly helpful if alfalfa, corn, or wheat is to be grown. Such drainage will help to prevent heaving and winterkilling. Oats, clover mixtures, and pasture normally do well without artificial drainage, but in some places drainage will help. Low-lying areas need to be kept in grass if they are flooded frequently.

PASTURE: This is a good soil for pasture because it holds moisture well during dry periods. Tall-grasses mixed with a legume, Ladino clover and orchardgrass, for example, are suitable. Bluegrass also does well and is not so much damaged by drought as it is on hilly pastures. Pastures require lime and fertilizer in amounts determined by soil tests, and they need management that will control weeds and other rank growth. This soil is likely to stay wet rather late in spring, so livestock should not be turned out on it until the sod is firm.

MANAGEMENT GROUP 10 (IIs-2)

The soils of management group 10 are deep, well drained, sandy, and a little droughty. Some of the more sandy areas dry out excessively during dry seasons, but most of the time they contain a fair amount of moisture for crops. The soils of this group are:

Pope fine sandy loam, 0 to 6 percent slopes.
Sequatchie fine sandy loam, 0 to 3 percent slopes.

These soils lie along streams, but the Sequatchie is high enough that it rarely floods. The Pope soil, however, may be flooded every year or only once in 10 to 12 years. Both of these soils warm up early in spring, are light and easy to work, and are generally well supplied with plant nutrients.

TILLED CROPS: The soils of this group are excellent for truck crops, but little truck cropping or market gardening is done in Preston County. The soils are nearly level. Special measures to control erosion are needed only for low areas that are frequently flooded and for a few narrow bands that have slopes of 10 to 15 percent. The erodible areas are best kept in hay or grass. A rotation that keeps hay on these soils at least 1 year in 3 will help to maintain organic matter.

LONG-TERM HAY: All hay mixtures do well on these soils if lime and fertilizer are added. This must be done frequently because the soils are loose and open. They lose potassium rapidly, so they need to be topdressed every year with a fertilizer that is high in that element.

PASTURE: These soils provide good bluegrass pasture early in spring, but they dry out during summer and early in fall. Tall-grass pastures do well, but they need a topdressing of fertilizer high in potassium every year. Bluegrass pastures may need small amounts of potash fertilizer. The amount required can be determined by soil tests. Low areas along the streams and old channels that flood frequently can be kept in permanent sod to prevent erosion.

MANAGEMENT GROUP 11 (IIIe-4)

In management group 11 are deep, loamy, well-drained Clymer and Shelocta soils on moderate slopes and a few acres of Rayne soils on gentle slopes that have been severely eroded. The soils of this group hold moisture well, but they will erode unless they are protected. They have about average natural fertility, but for crops such as alfalfa they are likely to be low in potassium. The soils in this group are:

Clymer loam, 10 to 20 percent slopes.
Rayne silt loam, 3 to 10 percent slopes, severely eroded.
Rayne silt loam, 10 to 20 percent slopes.
Shelocta silt loam, 10 to 20 percent slopes.

TILLED CROPS: Corn, oats or wheat, and 2 years of hay is a good rotation and one popular on these soils. The hay crops are needed to maintain tilth and the supply of organic matter. Stripcropping on the contour is required to control erosion, and natural waterways need to be kept in sod. On some long slopes diversion ditches are necessary to divert surface water.

LONG-TERM HAY: Alfalfa-grass mixtures require an annual topdressing with a fertilizer that is high in potassium, such as 0–20–20.

PASTURE: These soils warm up fairly early, so if they are managed properly, they provide good pasture in spring. They produce much more forage if seeded to tall grasses rather than to bluegrass and whiteclover. They are a little droughty for bluegrass and the other plants used in most permanent pastures. Liming is needed to correct the natural acidity. Pastures need to be topdressed with a phosphate-potash fertilizer because the soils are low in both of these elements.

MANAGEMENT GROUP 12 (IIIe 10)

Management group 12 consists of moderately deep, well-drained, loamy soils formed on acid shale or sandstone. Slopes are moderate, but the soils will erode seriously if not protected. Their natural fertility is about average. The soils are a bit droughty during long dry periods; they are naturally strongly acid and are low in phosphorus and fairly low in potassium. If erosion is controlled and fertility, tilth, and supplies of organic matter are maintained, they are suitable for all crops commonly grown in the county. These soils occupy about 36,000 acres. They are the following:

Calvin silt loam, 10 to 20 percent slopes.
Gilpin channery silt loam, 10 to 20 percent slopes.
Gilpin silt loam, 3 to 10 percent slopes, severely eroded.
Gilpin silt loam, 10 to 20 percent slopes.

TILLED CROPS: Row crops need to be rotated with sod crops. Contour stripcropping is required to control erosion, and diversion ditches may be needed on the longer slopes. Natural waterways kept in permanent sod will be less likely to gully. The amounts of lime and fertilizer necessary can be determined by soil tests.

LONG-TERM HAY: Hay needs to be seeded in strips on the contour, or, if strips are not used, on the contour in a trashy mulch. Alfalfa-grass mixtures do well if they are adequately limed and fertilized. Legume-grass mixtures need an annual topdressing of phosphate-potash fertilizer, for these soils are naturally low in phosphorus and somewhat limited in their ability to supply the amounts of potassium needed by crops that are heavy users of that nutrient.

PASTURE: Tall grasses do well. They need about the same quantities of lime and fertilizer as the hay mixtures. Permanent pasture of the bluegrass type produces well when there is plenty of moisture, but it dries out rather severely in hot, dry weather.

MANAGEMENT GROUP 13 (IIIe-11)

Belmont silt loam, 10 to 20 percent slopes, is the only soil in management group 13. This reddish-brown soil is naturally fertile, is well drained, and holds moisture well. It is naturally acid in the surface soil and the upper part of the subsoil. Erosion has been fairly serious in many areas. Good management, including careful control of erosion, is needed to keep the soil productive. It is suitable for all the uses and crops common in the county and is particularly good for legume hay or pasture. This soil occupies about 1,000 acres. It occurs mainly in broad bands on hillsides in the eastern part of the county where the Greenbrier limestone outcrops.

TILLED CROPS: Because of the slopes and hazard of erosion, row crops need to be rotated with sod crops. Crops ought to be planted in strips on the contour. If natural waterways are kept in sod, they will not gully. Diversion ditches are needed in many places, particularly where the soil is on lower parts of hillsides, below long, steep areas of other soils.

LONG-TERM HAY: If hay is seeded in contour strips or in a trashy mulch, loss of soil, seed, and fertilizer will be kept to a minimum. Mixtures of legumes and grasses need an annual topdressing of phosphate-potash fertilizer. The soil is almost invariably low in phosphorus, and it does not supply enough potassium for legumes and other heavy users of this nutrient.

PASTURE: This soil is good for bluegrass pasture if the surface layer is properly limed and fertilized. It normally has enough potassium for bluegrass pasture, but it is low in phosphorus.

MANAGEMENT GROUP 14 (IIIe-12)

In management group 14 are light, loamy, strongly acid soils that are shallow to moderately deep over sandstone. Slopes are moderate, and some erosion has taken place on most of the cleared areas. The soils are open and take in water readily, so it is not difficult to control runoff if the right management is used. The soils are:

Dekalb channery sandy loam, 10 to 20 percent slopes.
Dekalb loam, 10 to 20 percent slopes.

The natural fertility of these soils is below average, and they tend to be droughty. They are suitable for all commonly grown crops if fertilizer is added, erosion is controlled, and the supply of organic matter is maintained. They are good soils for potatoes but are a bit dry for bluegrass pastures. Angular pieces of sandstone are on the surface and throughout the subsoils, but they do not seriously interfere with normal farming. The soils of this group cover about 3,500 acres; they are fairly common in most of the county, particularly between Aurora and Cranesville.

TILLED CROPS: Contour stripcropping is required to prevent sheet and rill erosion. Natural waterways kept in sod will protect the soils from gullying. A cropping system that keeps the soils in hay at least 2 years out of 4 is desirable. A winter cover crop following each row crop will help to maintain and improve the supply of organic matter. If crop residues and litter are worked into the soil, they help to protect it from erosion and to maintain the supply of organic matter.

LONG-TERM HAY: Alfalfa will withstand the dryness of these soils if their strong acidity is corrected and enough fertilizer is added. Plant nutrients leach out rather rapidly every summer, so legume-grass mixtures need an annual topdressing of fertilizer high in potassium.

PASTURE: Bluegrass pasture burns out rather severely during the dry summer months. If deeper rooted tall grasses are sown, much more forage will be produced The tall grasses need about the same fertilizer as the long-term hay. The soils warm up and firm up early in spring. If they were not overgrazed the previous summer, they provide good pasture early in spring. But if the bluegrass and whiteclover were heavily grazed during the dry summer, the pasture will be poor the following spring.

MANAGEMENT GROUP 15 (IIIe-13)

The soils in management group 15 are moderately well drained but have a tight pan in the lower subsoil. Some slopes are rather strong for crops, and serious erosion has taken place in many areas. In this group are the following soils:

Ernest silt loam, 3 to 10 percent slopes, severely eroded.
Ernest silt loam, 10 to 20 percent slopes.
Monongahela silt loam, 10 to 20 percent slopes.
Wharton silt loam, 3 to 10 percent slopes, severely eroded
Wharton silt loam, 10 to 20 percent slopes.

These soils have silty or loamy surface soils and are easily worked where they are not severely eroded. A siltpan or claypan is in the subsoil, generally about 18 to 30 inches below the surface. Water moves readily through the surface soil and upper part of the subsoil, but it passes through this pan very slowly. During wet periods, particularly in winter and early in spring, water backs up on top of this tight layer, prevents good aeration, and may cause winterkilling and heaving of deep-rooted plants such as alfalfa. The pan also tends to increase surface runoff and erosion. Much of the acreage, particularly that occupied by the Ernest soils, lies at the base of long slopes and receives surface and subsurface water from hillsides above. Wet-weather seeps are common in the Ernest and Wharton soils.

In natural fertility the soils range from somewhat below average for the Monongahela to a little above average for the Ernest. All are strongly acid throughout.

This fairly extensive group of soils occupies about 14,000 acres. Almost every farm has at least a few acres of one or more of these soils. They are suitable for most of the crops commonly grown if erosion is carefully controlled and other good management is practiced. These are fairly good soils for pasture.

TILLED CROPS: Because of their heavy, tight, lower subsoils, these soils are not good for potatoes. They need a rotation that will keep hay on them 2 years in every 4 years. Contour stripcropping and sodded waterways help to control runoff and erosion. In many places diversion ditches are needed to cut off surface and subsurface water (fig. 4). These ditches are particularly useful on the Ernest soils, which normally receive a lot of surface runoff and subsurface water from adjacent higher slopes. Such ditches, properly located, help to pick up water from the seepy spots or wet-weather springs that are common in the Ernest and Wharton soils. The surface layer of these soils puddles rather easily, so use of winter cover crops and working in of crop residues help to improve the structure.

LONG-TERM HAY: Seeding in contour strips or in a trashy mulch seedbed helps to prevent erosion. The Monongahela soils are normally very low in potassium,

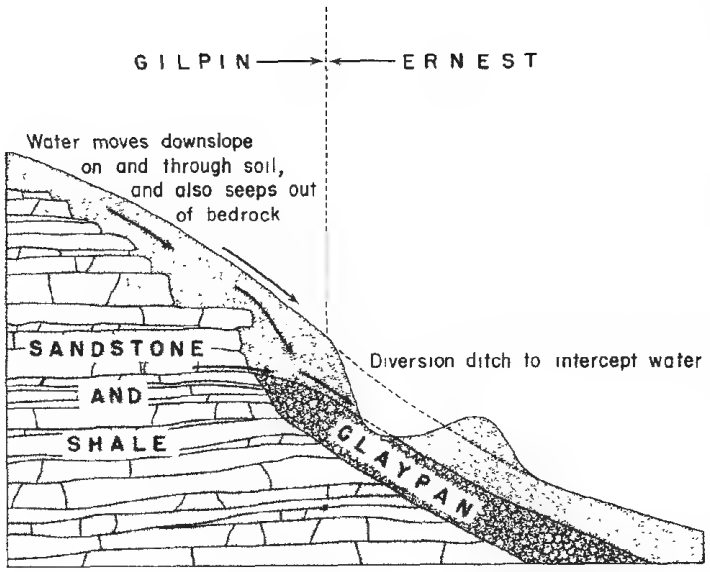

Figure 4.—**Diagram showing position of diversion ditch on an Ernest soil.**

and all these soils are generally low in phosphorus. Alfalfa and clover require topdressing every summer with a phosphate-potash fertilizer. Alfalfa may not last so long as on well-drained soils, but it is worth using in mixtures with other legumes and grasses.

PASTURE: The moisture supply in these soils is generally adequate for good permanent pasture. Pastures of bluegrass and whiteclover need plenty of phosphate, and on the Monongahela soil they require a phosphate-potash fertilizer. Many farm ponds are built on the Ernest soils, as they are suitable for structures of this sort.

MANAGEMENT GROUP 16 (IIIe-14)

Clarksburg silt loam, reddish variant, 10 to 20 percent slopes, is the only soil in management group 16. It is a reddish-brown, moderately well drained soil that has formed in materials derived from limestone or limy shales. It is naturally acid in the surface soil and upper subsoil. Its natural fertility is slightly above average, but, if it is to be used for crops, the soil needs careful control of erosion and other good management.

The soil occupies about 500 acres in the eastern part of the county. It is on slopes below areas of Calvin and Belmont soils. It is similar to the soils of group 15, although it is more productive, particularly of grasses and legumes. The management suggested for those soils is suitable for this soil.

MANAGEMENT GROUP 17 (IIIe-15)

Management group 17 consists of heavy, reddish-brown, clayey soils. They formed on clay shales that contain a little lime. They are tough, sticky, and hard to work. If worked when wet, they become very cloddy when they dry. They are well drained but take in water slowly, so surface runoff is high. The soils in this group are:

Upshur silty clay loam, 3 to 10 percent slopes.
Upshur silty clay loam, 10 to 20 percent slopes.

These soils slip and gully badly if they are not carefully managed. Erosion is serious in many places. The soils can be used safely for tilled crops if erosion is controlled and sod crops are included in the cropping system. Where they are not needed for row crops, they are best used for hay or pasture. The fertility of the soils is slightly above average, and, if carefully managed, they are well suited to pasture made up of alfalfa, clovers, and bluegrass.

In most places these soils contain little phosphorus but a fairly good supply of potassium. The surface soils and upper subsoils are acid, and, because of the large amount of clay, much lime is required to correct the acidity. These soils occupy about 350 acres in the southwestern part of the county, near Fellowsville.

TILLED CROPS: Contour stripcropping and sod waterways are needed to control erosion. In many places diversion ditches are required to take off surface water. If crop litter is worked into the surface soil, it will improve the tilth. The soil ought to be in sod crops 2 years out of 4. All crops in the rotation need fertilizer in amounts determined by soil tests. Corn should be followed by a winter cover crop.

LONG-TERM HAY. These soils need a trashy mulch if hay is to be seeded. If the field is plowed before seeding, the furrows ought to be on the contour and protected by strips of other crops. Alfalfa-grass mixtures grow well, though some heaving may occur in spring. A good tight sod provides much organic matter, improves soil structure, and helps prevent damage from heaving. Alfalfa alone does not form a tight sod. A grass-alfalfa mixture is needed. The stand will last longer if it is topdressed every summer with a fertilizer that contains some potassium and much phosphorus. After the hay crop is harvested, carefully managed meadows will provide much grazing.

PASTURE: Some of the worst erosion is on overgrazed pastures. Because the soils stay wet and soft until late in spring, livestock ought to be kept off until the sod is firm. Stocking according to the grazing capacity of the pasture helps to prevent damage. These soils need lime in amounts that will keep the pH at about 6.0. About every 4 years, they require a topdressing of phosphate in amounts shown necessary by soil tests.

MANAGEMENT GROUP 18 (IIIw-1)

The soils in management group 18 are wet. They are flooded as often as once or twice a year or as seldom as once every 4 or 5 years. Normally they are too wet for any use except pasture, and the pastures generally are poor and covered with sedges and other swamp plants. The soils of this group are:

Atkins silt loam.
Elkins silty clay loam.
Melvin silt loam.

The surface soils are dark gray or dark brown. When dry, they are mellow and loamy. The subsoils are generally somewhat clayey, and water moves through them slowly. The Atkins and Elkins soils are strongly acid throughout their depth and occur in all parts of the county. The Melvin soil occurs only in the eastern part where the flood plains have formed in materials derived from limestone or limy shales.

Slightly more than 5,000 acres of these soils are in Preston County. Much of the acreage is in glades. The soils are level or nearly level. Low spots without a natural outlet for drainage are common. These low spots are the wettest areas, and most of them are at the edge of the bottom land, away from the streams.

These soils respond to carefully planned drainage. If the drainage system is kept in good condition, the soils are suitable for crops grown in rotation that will maintain structure and a good supply of organic matter.

TILLED CROPS: Because of the slow movement of water, these soils need drainage, either by open ditches or by tile installed in rather closely spaced parallel lines. Drains are particularly effective along the outer edges of the bottom land. They intercept surface water from the nearby hillsides and subsurface seepage from the soils and rock layers on the adjacent uplands.

After they are drained, these soils need a rotation that includes sod crops. Lime is needed, generally in large quantities, because the soils are highly buffered; that is, they tend to tie up large amounts of plant nutrients. The soils require fertilizer. The amounts can be determined by soil tests.

If these soils are worked when they are very wet, their natural structure will break down and the value of the drainage system will be less. The best crops are those that will stand some wetness Even if they are drained, these soils will not be so well aerated as those that are naturally well drained Oats generally do better than wheat Clovers, particularly Ladino clover, grow better than alfalfa and similar deep-rooted legumes.

LONG-TERM HAY: For best results with hay, the soils will need some artificial drainage. They hold moisture well during hot, dry periods, so they can produce tall grasses that will withstand the wetness. Hay needs a topdressing of phosphate-potash fertilizer every year.

PASTURE: Permanent pastures of bluegrass and white-clover do well if they are properly limed and fertilized. They need a topdressing of phosphate fertilizer every fourth year. Some artificial drainage is required in most places, but it need not be so intensive as for field crops. Soil and sod need to be firm before pastures are grazed.

MANAGEMENT GROUP 19 (IIIw-5)

In management group 19 are nearly level to gently sloping, somewhat poorly drained soils that have a tight, heavy claypan in the subsoil The surface soils are medium in texture and not hard to work, but the tight clayey layer at depths of 12 to 18 inches seriously slows movement of water. The soils of this group are:

Cavode silt loam, 3 to 10 percent slopes.
Tyler silt loam, 0 to 6 percent slopes.

These soils are highly erodible and have been seriously eroded in many areas. If erosion is controlled and the soils are carefully managed to maintain good tilth, structure, and fertility, they are suitable for row crops that will stand some wetness, or for any less intensive use. If row crops are grown, the rotation will need to include sod crops to control erosion.

The Cavode soil occupies 3,150 acres. It occurs in small areas and is associated with the Gilpin and Wharton soils. In many places it is a small area in the same field with those soils and, therefore, cannot be managed differently. The Tyler soil covers only 225 acres.

TILLED CROPS: These soils need a cropping system that will keep them in sod crops part of the time. Heaving and winterkilling are serious hazards, so oats do better than wheat. The soils are strongly acid throughout and low in all the major plant nutrients, particularly in phosphorus. Stripcropping at a grade of about 1 percent will help control erosion without holding too much surface water.

In most places diversion ditches are needed to intercept surface water and water moving through the soils above the pan. Tile drainage generally is not effective, because of the tight clay subsoil The soils puddle easily and become cloddy if worked when too wet. Winter cover crops help to prevent erosion and puddling of the surface soil.

LONG-TERM HAY: If these soils are not needed for row crops, they can be used for hay mixtures that will stand wetness in the lower part of the root zone. Hay meadows require topdressing every summer with a fertilizer that contains much phosphate and some potash for the legume. The amounts needed can be determined by soil tests

PASTURE: Tall-grass pastures do well if a mixture that will tolerate wetness is used. A mixture of Ladino clover and orchardgrass or tall fescue is suitable. Permanent pastures will produce well if they are limed to at least pH 6 0 and topdressed with phosphate fertilizer. These soils dry out late in spring, so they need to be kept clear of livestock until they are firm.

MANAGEMENT GROUP 20 (IVe 3)

Management group 20 consists mainly of shallow to moderately deep, well-drained soils that formed in material from acid sandstone and shale. The surface soils are loamy and take in water readily, but slopes are strong, and erosion is moderate to severe. The soils are:

Calvin silt loam, 10 to 20 percent slopes, severely eroded.
Calvin silt loam, 20 to 30 percent slopes.
Calvin silt loam, 20 to 30 percent slopes, severely eroded.
Dekalb channery sandy loam, 20 to 30 percent slopes.
Dekalb loam, 10 to 20 percent slopes, severely eroded.
Dekalb loam, 20 to 30 percent slopes.
Dekalb loam, 20 to 30 percent slopes, severely eroded.
Gilpin channery silt loam, 10 to 20 percent slopes, severely eroded.
Gilpin channery silt loam, 20 to 30 percent slopes.
Gilpin channery silt loam, 20 to 30 percent slopes, severely eroded.
Gilpin silt loam, 10 to 20 percent slopes, severely eroded.
Gilpin silt loam, 20 to 30 percent slopes.
Gilpin silt loam, 20 to 30 percent slopes, severely eroded.
Rayne silt loam, 10 to 20 percent slopes, severely eroded.
Shelocta silt loam, 20 to 30 percent slopes.

These soils are capable of producing long-term hay, pasture, or trees, but, because of slope and erosion, it is best to cultivate them only when it is necessary to reseed. They are somewhat droughty for bluegrass pasture.

Soils of this group cover about 46,000 acres. They occur throughout the county and on almost every farm.

LONG-TERM HAY: Alfalfa-grass mixtures do well if the strong acidity of the soils is corrected and sufficient fertilizer is added. The soils are generally low in both phosphorus and potassium, so an annual topdressing of phosphate-poaash fertilizer is necessary to hold a stand of alfalfa for several years. Reseeding on the contour in a trashy mulch helps to control runoff and to conserve moisture. If the seedbed is prepared by plowing, contour stripcropping is needed. Severely eroded spots and gullies can be stabilized by smoothing steep areas, fertilizing at about double the normal rate, and seeding and mulching. Diversion ditches may be required to take water away from gullies that are active.

PASTURE: Tall grasses withstand droughts better than bluegrass and produce more pasture. The tall-grass

pastures need about the same amount of lime and fertilizer as long-term hay and are treated in the same way if a seedbed is to be prepared. Bluegrass pasture does fairly well except during hot, dry periods; it provides good grazing in spring and early in summer if livestock is kept off until the sod is firm. Overgrazing in fall will damage the sod and reduce the growth in spring. Gullied and other severely eroded areas in pastures need to be managed the same as those in hay meadows, and they will require protection from overgrazing.

MANAGEMENT GROUP 21 (IVe-9)

Management group 21 consists of gently sloping to steep, moderately well drained and somewhat poorly drained soils. They are moderately eroded to severely eroded. The hazard of further erosion can be offset by keeping the soils in grass most of the time and by tilling them only when it is necessary to reseed. The soils in this group are:

Cavode silt loam, 3 to 10 percent slopes, severely eroded
Cavode silt loam, 10 to 20 percent slopes.
Ernest silt loam, 20 to 30 percent slopes.
Wharton silt loam, 10 to 20 percent slopes, severely eroded.
Wharton silt loam, 20 to 30 percent slopes.
Wharton silt loam, 20 to 30 percent slopes, severely eroded.

All of these soils formed in materials derived from acid shale and sandstone. They have a heavy, tight layer of clay in the lower part of the subsoil.

These soils are not suitable for row crops but will produce clover-grass mixtures for permanent pasture Alfalfa may do poorly because of heaving and winterkilling in years when there is a lot of freezing and thawing. Nevertheless, alfalfa is worth using with other legumes and grasses.

Long-term Hay: These soils are suitable for hay mixtures that will stand some wetness in the lower part of the root zone. Small wet spots are common. If Ladino clover is used in the mixture, it will fill in the wet areas and provide good grazing after the hay is harvested Lime is needed to correct natural acidity. The soils are normally low in phosphorus and fairly low in potassium, so meadows need an annual topdressing of phosphate-potash fertilizer.

These soils need to be reseeded in strips on the contour. If a trashy mulch seedbed is used, they can be seeded on the contour and the protective strips will not be required. Gullies can be controlled by sloping them, fertilizing at double the normal rate, seeding, and mulching. Diversion ditches may be required to keep runoff water from entering gullies

Pasture: Ladino clover-orchardgrass or a similar mixture of a legume and tall grasses does well on these soils. They need lime and fertilizer and are seeded in the same manner as the long-term hay. These soils are suitable for pastures made up mainly of bluegrass and whiteclover. Pastures of this kind need lime enough to bring the pH to 6 0 and a topdressing of phosphate every 4 years. The soils stay wet in spring, so livestock ought to be kept off until the soil and sod are firm. Gullied and badly eroded areas ought to be sloped, heavily fertilized, mulched, seeded, and protected from overgrazing.

MANAGEMENT GROUP 22 (IVe-11)

Belmont silt loam, 20 to 30 percent slopes, is the only soil in management group 22. It is shallow to somewhat deep, well drained, lime influenced, and on moderately steep slopes. Some area are severly eroded. The slopes are so steep, and danger of erosion is so great that the soil needs to be kept in close-growing vegetation unless tillage is needed to reseed. The soil holds moisture fairly well, and its natural fertility is good. Although it is not suitable for tilled crops, it is a good soil for alfalfa and pasture. It occurs only in the limestone belt, that is, in the eastern part between Aurora and Cranesville.

Long-term Hay: Alfalfa-grass is a good long-lived mixture for these soils. To prepare the seedbed, tillage needs to be on the contour. A trashy mulch seedbed helps to prevent loss of soil, seed, and fertilizer, and if it is not used, contour stripcropping is necessary. Meadows need to be topdressed annually with a fertilizer that contains much phosphate and some potash. Small, severely eroded, bare areas and gullies occur in places. These need to be sloped, fertilized at about double the normal rate, seeded, and mulched. Diversion ditches may be necessary to keep water from concentrating in gullies.

Pastures: Tall grasses yield well. They should be fertilized and limed in about the same manner as long-term hay. Bluegrass pastures do very well except during hot, dry periods. They need large additions of phosphate, but these soils normally contain sufficient potassium.

Livestock ought to be kept off the pastures in spring until the soil is firm, and they need to be taken off in fall in time to allow the sod to be in good condition when winter arrives. Gullies and other bare, eroded areas need to be stabilized and protected from overgrazing.

MANAGEMENT GROUP 23 (IVe-15)

Management group 23 consists of heavy, reddish-brown, clayey soils on strong slopes. They are the following:

Upshur silty clay loam, 20 to 30 percent slopes.
Upshur silty clay loam, 20 to 30 percent slopes, severely eroded.

The soils formed on clay shales that are influenced by lime, but they are acid to depths of at least 2 or 3 feet. Water enters and moves through the soils slowly, so runoff is high. Serious slips are likely to occur in winter or early in spring when the lower subsoil, just above the smooth shale, is thoroughly saturated and overloaded with water.

These soils are tough and hard to work. Because of this, and their susceptibility to more erosion, it is best to keep them in hay or pasture as much as possible. The natural fertility of the soils is good. They supply much potassium but are normally low in phosphorus. They are good for legumes and grasses.

Only about 700 acres of these soils are in the county. The soils are entirely in the southwestern corner near Fellowsville, but they are important on the farms of that area.

Long-term Hay. A trashy mulch seedbed prepared in contour strips helps to save soil, fertilizer, seed, and moisture. Alfalfa-grass mixtures do well, though heaving may occur late in winter and in spring. A good grass-legume sod will increase supplies of organic matter, improve structure, reduce depth of freezing, and help to prevent heaving.

Meadows need to be topdressed every summer with fertilizer that contains much phosphorus and some potassium. After the hay is harvested, the meadows

provide good forage if they are carefully managed Gullies and other badly eroded areas need to be sloped, fertilized at about double the normal rate, mulched, and seeded.

PASTURE: These soils wash and gully badly if overgrazed. They are slow to firm up in spring, so it is best to keep livestock off until danger of damage from trampling is past. Lime is needed to keep the pH above 6.0, and the pastures require a topdressing of phosphate every 4 years. The right quantities can be determined by taking soil tests

MANAGEMENT GROUP 24 (IVw-1)

In management group 24 are wet soils that have a tight, heavy subsoil. The soils are nearly level to gently sloping. Their natural drainage is so poor, and they are so difficult to drain that they are best used for hay and pasture plants tolerant of wetness. Surface drainage is generally needed for any profitable use. With such drainage, row crops or small grains tolerant of wetness can be grown occasionally. The soils that make up this management group are:

Atkins silty clay loam.
Brinkerton silt loam, 0 to 3 percent slopes.
Brinkerton silt loam, 3 to 10 percent slopes
Lickdale silty clay loam, 0 to 6 percent slopes.
Mixed alluvial land.

The soils occur mainly in and around the edges of the streamhead swamps, or glades, that are common in the county. They occupy about 6,500 acres. The surface soils are gray and medium to somewhat heavy in texture. The subsoils are generally strongly acid and tend to tie up large amounts of plant nutrients. The soils require large amounts of lime to correct acidity, and they normally have low supplies of phosphorus and potassium.

The Mixed alluvial land varies sharply in texture and other properties within short distances. Generally, however, it has about the same capabilities for use as the other soils. On some of the bottom lands it has been influenced by acid water from coal mines. The Atkins soil and Mixed alluvial land are subject to overflow by streams.

LONG-TERM HAY: Almost all areas need some artificial drainage. Open ditches help to lower the water table. If they are located around the borders of wet areas, they intercept excess runoff and subsurface flow from adjacent slopes. In most places the tight subsoil prevents tile from lowering the water table effectively. Tile is useful in draining water from seepage spots.

These soils need mixtures that will stand wetness. Mixtures of Ladino clover and timothy, orchardgrass, or other tall grasses do well after sufficient lime and fertilizer are supplied. Such mixtures need a topdressing of phosphate-potash fertilizer every year.

PASTURE: If the soils are properly limed and fertilized, pastures of bluegrass and whiteclover grow well and yield comparatively well during dry periods. Pastures need careful management for grazing. If livestock trample them when the soil is soft, the drainage ditches and sod will be damaged.

MANAGEMENT GROUP 25 (VIe 2)

Management group 25 consists of steep, shallow, acid, well-drained soils formed from acid shales and sandstone. Because of slope and susceptibility to erosion, the soils are best kept in pasture or trees. The soils of this group are:

Gilpin silt loam, 30 to 40 percent slopes
Gilpin channery silt loam, 30 to 40 percent slopes.
Calvin silt loam, 30 to 40 percent slopes.

These soils occur in all parts of the county and have a total area of about 34,000 acres. They are widely used for pasture and timber, though they are so steep that liming, fertilizing, and other management practices are rather difficult to apply. The soils are not suitable for tilled crops. They will produce satisfactory permanent pasture if they are well managed. If they are not required for pasture, they can be retired to trees.

PASTURE: These soils need a topdressing of phosphate and enough lime to bring them to at least pH 6.0. The labor needed to treat these steep soils is expensive, so it pays to use the most concentrated form of phosphate fertilizer available and to apply enough to last several years. Phosphorus does not leach away seriously in these soils. Weeds ought to be mowed or otherwise controlled.

Overgrazing will damage the sod and encourage serious erosion. The soils warm up early in spring, but livestock ought to be kept off them until the sod and soil are firm.

Pastures made up mainly of bluegrass and whiteclover are practically dormant during hot, dry periods. Livestock will require pasture on other soils during this time. Gullies and other small, severely eroded areas generally need to be sloped, fertilized heavily, seeded, mulched, and protected from grazing.

WOODLAND: About 65 percent of the acreage in this management group is used for trees. For details on management see the section, Woodland and its Management.

MANAGEMENT GROUP 26 (VIe-3)

In management group 26 are shallow to moderately deep, lime-influenced soils on steep slopes. They are well drained, naturally fertile, and hold moisture fairly well. The soils of this group are:

Belmont silt loam, 30 to 40 percent slopes.
Upshur silty clay loam, 30 to 40 percent slopes.

The soils of this group are important for pasture on the farms where they occur. The Belmont soil is in steep bands on hillsides in areas between Aurora and Cranesville. The Upshur soil occurs only south of Fellowsville. The total extent is about 700 acres.

These steep, highly erodible soils cannot be used safely for tilled crops or hay. They are suitable for bluegrass pasture if they are properly limed and fertilized. Areas not required for pasture are best used as woodland.

PASTURE: These soils need to be limed to a pH of at least 6 0 and topdressed with phosphate fertilizer. They hold phosphorus without serious losses through leaching. The soils will be seriously damaged if they are grazed when soft. Pastures do better if they are not overgrazed and livestock is kept off until the sod is firm. Gullies and other small, severely eroded areas can be stabilized by protecting them from grazing, fertilizing heavily, seeding, and mulching.

WOODLAND: Management for woodland is described in the section, Woodland and its Management.

MANAGEMENT GROUP 27 (VIs-1)

In management group 27 are lime-influenced, well-drained soils on moderate to steep slopes. They are naturally fertile but too stony to be used for tilled crops or hay. The stones make management of pasture difficult,

particularly mowing and the spreading of lime and fertilizer. Only about 500 acres of these soils occur in the county. The soils are:

Belmont stony silt loam, 10 to 20 percent slopes
Belmont stony silt loam, 20 to 30 percent slopes

PASTURE: These soils need to be limed to a pH of at least 6.0 and topdressed with phosphate fertilizer They hold phosphorus without serious loss through leaching, so it will save labor if enough phosphate is added to last several years These soils are seriously damaged if grazed when soft. They ought to be kept free of livestock until the sod is firm Grazing should be adjusted to the carrying capacity of the pastures Gullies and other small, severely eroded areas can be stabilized by protecting them from grazing, fertilizing heavily, seeding, and mulching.

If these soils are to be used for pasture, it is preferable to clear the stones so standard practices of pasture management can be used. If they are not cleared, they probably are best used as woodland.

WOODLAND: These are good forest soils (see the section, Woodland and its Management).

MANAGEMENT GROUP 28 (VIs 2)

In management group 28 are moderately well drained to poorly drained stony soils that are best used for pasture or trees Only about 10 percent of the soils in this group are in pasture; the rest of the acreage is wooded. The soils are:

Brinkerton stony silt loam, 0 to 15 percent slopes.
Ernest stony silt loam, 3 to 20 percent slopes
Ernest stony silt loam, 20 to 30 percent slopes
Lickdale stony silty clay loam, 0 to 15 percent slopes.

These soils hold a large supply of moisture, and trees grow rapidly on them. The soils can produce good pasture, but the stones make it difficult to lime and fertilize. It is advisable either to remove the stones and manage these soils for pasture or to use them as woodland.

PASTURE: These soils are strongly acid. They will need lime enough to bring their pH to 6.0, and they will require phosphate fertilizer. Weeds ought to be clipped and brush kept down If livestock is put on the pasture before the soils are firm, the sod and the soils will be damaged.

WOODLAND: These soils are among the best in the county as sites for timber (see the section, Woodland and its Management).

MANAGEMENT GROUP 29 (VIIe 1)

Management group 29 consists of steep, stony, lime-influenced soils that are best suited to trees. The soils are the following:

Belmont silt loam, 40 to 65 percent slopes.
Belmont stony silt loam, 30 to 40 percent slopes

A few acres of these soils are used for pasture, but the steep slopes and many stones make management difficult.

WOODLAND: The moisture supply is generally good, so these soils are among the best in the county as sites for trees (see the section, Woodland and its Management).

MANAGEMENT GROUP 30 (VIIe-2)

Management group 30 consists of shallow and moderately deep, mostly steep and very steep soils that formed on acid sandstone and shale. Soils of this management group cover about a third of the county and are best used as woodland. The soils occur in all parts of the county but are especially extensive in the mountain areas along the gorge of the Cheat River and along steep-sided valley walls of tributaries to the Cheat River. The soils of this management group are:

Calvin silt loam, 30 to 40 percent slopes, severely eroded.
Calvin silt loam, 40 to 65 percent slopes
Cookport stony silt loam, 5 to 20 percent slopes.
Dekalb channery sandy loam, 30 to 40 percent slopes.
Dekalb channery sandy loam, 40 to 65 percent slopes
Dekalb loam, 30 to 40 percent slopes.
Dekalb stony loam, 5 to 20 percent slopes.
Dekalb stony loam, 20 to 30 percent slopes
Dekalb stony loam, 30 to 40 percent slopes
Dekalb stony loam, 40 to 65 percent slopes
Dekalb stony sandy loam, 5 to 20 percent slopes
Dekalb stony sandy loam, 20 to 30 percent slopes.
Dekalb stony sandy loam, 30 to 40 percent slopes
Dekalb stony sandy loam, 40 to 65 percent slopes
Gilpin channery silt loam, 40 to 65 percent slopes.
Gilpin stony silt loam, 3 to 10 percent slopes
Gilpin stony silt loam, 10 to 20 percent slopes
Gilpin stony silt loam, 20 to 30 percent slopes
Gilpin stony silt loam, 30 to 40 percent slopes
Gilpin stony silt loam, 40 to 65 percent slopes
Gilpin silt loam, 40 to 65 percent slopes

All of these soils except Cookport stony silt loam and the Dekalb loam are well drained The small area of the Cookport is moderately well drained; the Dekalb is well drained to excessively drained. About 90 percent of the acreage in this management group is used as woodland. Approximately 80 percent of the total acreage in the unit is stony

WOODLAND: Trees grow on these soils at varying rates, depending on their location on the slope and the direction of exposure. Generally, however, the soils are capable of producing good timber (see the section, Woodland and its Management).

MANAGEMENT GROUP 31 (VIIe-3)

Management group 31 consists of steep and very steep, acid soils that are severely eroded. Erosion has removed all, or almost all, of the original surface soil. Because they are steep and erodible, these soils are best used for trees. The soils are:

Calvin silt loam, 40 to 65 percent slopes, severely eroded
Dekalb loam, 30 to 40 percent slopes, severely eroded.
Gilpin channery silt loam, 30 to 40 percent slopes, severely eroded.
Gilpin silt loam, 30 to 40 percent slopes, severely eroded
Upshur silty clay loam, 30 to 40 percent slopes, severely eroded.

PASTURE: Most of the acreage is in pasture of poor quality. The soils are so steep and badly eroded that there is not much opportunity to produce good pasture on them.

WOODLAND: These soils have low potential value for timber, but reforestation will check erosion and reduce runoff and consequent flooding of other soils. Eventually some timber can be cut from reforested tracts (see the section, Woodland and its Management).

Estimated Yields of Principal Crops

Table 1 gives estimated average acre yields of the principal crops for the gently sloping soils of the county. The yields are at two levels of management. In columns A are yields obtained under common practices. Under these practices it is to be assumed (1) that the cropping

system consists of corn, a small grain, and a hay crop for 2 years or more; and (2) that the amount of lime and fertilizer used is below that required to produce high yields.

In preparing estimates, average yields from 1950 and 1954 census reports were used as a base, and it was assumed that Gilpin silt loams on slopes of 0 to 10 percent were average in yields. The Gilpin soils were chosen as average because most of the cropland in the county is on those soils. Yields on other soils were estimated as being above or below the average yields for the Gilpin silt loams The estimates took into account differences in the natural fertility of the soils and in the management they received in the past. Some of the factors that were considered are soil reaction, natural fertility, tilth, and natural drainage. On some soils, yields are limited by flooding or by droughtiness.

Yields in columns B are those that can be obtained under more careful and intensive practices than are used to get the yields in columns A. The yields in columns B are based on yields obtained by farmers in the area and on yields reported from experimental plots on some of the soils. They represent an average yield over a period of years, not a maximum yield in a favorable season.

Comparison of yields in columns B with those in columns A will show the response to be expected when management is improved. Some soils respond better to management than others. The soils that show the best response frequently are those that have a favorable texture and structure and drainage that can be improved

TABLE 1.—*Estimated average acre yields of principal crops*

[Yields in columns A obtained under common practices; those in columns B obtained with improved management (see text for definition of management at common and improved levels), absence of a yield figure indicates crop is not commonly grown under the management level indicated]

Soil	Grain crops						Forage crops				Permanent pasture	
	Corn		Wheat		Oats		Mixed hay [1]		Alfalfa [2]			
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu	*Bu*	*Bu*	*Bu*	*Bu*	*Bu*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow acre days* [3]	*Cow acre-days* [3]
County average	55	80	24	35	39	70	1 1	2 4	1 7	3 0		
Atkins silt loam	35	65	15	25	30	55	1 0	1 8			45	110
Atkins silty clay loam							8	1 5			40	100
Belmont silt loam, 3 to 10 percent slopes	65	95	35	40	50	75	1 5	3 0	2 5	4 0	80	160
Belmont stony silt loam, 10 to 20 percent slopes											70	140
Brinkerton silt loam, 0 to 3 percent slopes							8	1 5			45	120
Brinkerton stony silt loam, 0 to 15 percent slopes											40	110
Calvin silt loam, 3 to 10 percent slopes	50	75	25	32	40	65	1 2	2 4	1. 7	3. 0	30	110
Cavode silt loam, 3 to 10 percent slopes	40	60	18	28	55		1 0	2 3			40	120
Clarksburg silt loam, reddish variant, 3 to 10 percent slopes	60	90	33	40	50	75	1 5	2 8	1 4	2 8	80	160
Clymer gravelly loam, 3 to 10 percent slopes	45	70	21	30	40	70	1 1	2 0	1 5	2 8	35	110
Clymer loam, 0 to 3 percent slopes	50	75	23	32	45	70	1. 2	2 4	1 5	2 8	40	120
Cookport silt loam, 3 to 10 percent slopes	30	60	15	22	30	55	. 7	1 5			30	110
Cookport stony silt loam, 5 to 20 percent slopes											25	
Dekalb channery sandy loam, 3 to 10 percent slopes	35	65	18	25	35	65	8	1 6	1 2	2 5	25	90
Dekalb loam, 3 to 10 percent slopes	45	70	21	30	40	75	1 0	2 0	1 4	2 8	35	120
Dekalb stony loam, 5 to 20 percent slopes											25	
Dekalb stony sandy loam, 5 to 20 percent slopes											20	
Elkins silty clay loam	45	80	21	32	35	70	7	2 0			50	140
Ernest silt loam, 3 to 10 percent slopes	60	80	30	38	45	70	1 2	2 5	1 3	2 5	60	140
Ernest stony silt loam, 3 to 20 percent slopes											50	130
Gilpin channery silt loam, 3 to 10 percent slopes	50	75	23	32	45	70	1 1	2 4	1 7	3 0	35	120
Gilpin silt loam, 3 to 10 percent slopes	55	80	24	35	39	70	1 1	2 4	1 7	3 0	40	130
Gilpin stony silt loam, 3 to 10 percent slopes											30	
Lickdale silty clay loam, 0 to 6 percent slopes							8	1 5			25	90
Lickdale stony silty clay loam, 0 to 15 percent slopes											20	80
Melvin silt loam	45	75	15	25	30	55	1 1	2 3			60	130
Mixed alluvial land							1 0	1 8			45	110
Monongahela silt loam, 0 to 10 percent slopes	40	70	18	28	35	65	9	2 0			35	120
Philo silt loam	60	85	25	35	35	65	1 4	2 6			70	155
Pope fine sandy loam, 0 to 6 percent slopes	60	85	25	35	40	70	1 2	2 4	2 0	3 5	70	140
Pope gravelly silt loam	65	90	30	38	45	75	1 5	3 0	2 2	3 7	85	150
Pope silt loam	70	100	30	38	50	75	1 5	3 0	2. 2	3 7	90	170
Rayne silt loam, 3 to 10 percent slopes	55	80	25	35	45	70	1 2	2 6	1 8	3 2	40	130
Sequatchie fine sandy loam, 0 to 3 percent slopes	65	95	25	38	45	75	1 5	2. 8	2 4	3 8	70	150
Shelocta silt loam, 3 to 10 percent slopes	65	90	33	40	50	75	1 5	3 0	2 4	4 0	80	150
Tyler silt loam, 0 to 6 percent slopes	40	65	15	28	35	65	1 0	2 0			40	130
Upshur silty clay loam, 3 to 10 percent slopes	60	80	33	40	45	70	1 5	2 8	2. 5	4 0	70	150
Wharton silt loam, 3 to 10 percent slopes	55	75	30	32	40	70	1. 0	2 5	1 5	2 8	50	130

[1] Mixed hay refers mainly to a mixture of clover and grass.

[2] Alfalfa refers to a mixture of alfalfa and grass.

[3] Cow-acre-days refers to the number of days in a year a mature animal (cow, horse, or steer) can graze an acre without damaging the pasture.

without much difficulty. The increase in yields under improved management is greater from pasture and hay than from grain crops. This increase can be accounted for by the fact that the grain crops, as they are commonly managed in the county, receive better management than pasture or hay. In fact, under common management, many of the pastures and hayfields have received little special management.

The yield estimates in table 1 are primarily for soils on slopes of not more than 10 percent. For soils that have slopes of 10 to 20 percent, yields of grain are likely to be 5 to 10 percent less than the estimates given in table 1 for soils of the same type. For soils that have slopes of 20 to 30 percent, yields of grain need not be estimated because the soils are obviously too steep for grain. Yields of forage on soils with slopes of 20 to 30 percent will likely be 5 to 10 percent less than the estimates given in table 1.

For soils that are moderately or severely eroded, the estimates on grain yields given in table 1 should be reduced by 5 to 15 percent, in addition to any reduction that needs to be made for slope. Likewise, for eroded soils, yields for forage should be reduced 5 to 10 percent from those given in table 1, aside from any reduction that needs to be made for slope. For example, a soil on slopes of 10 to 20 percent and severely eroded would be expected to yield 10 to 25 percent less grain and 5 to 10 percent less hay or pasture than soils of the same type on slopes not exceeding 10 percent.

Woodland and its Management[1]

Approximately 57 percent of Preston County is wooded. Most farms have some woodland. In addition, there are large areas of woodland in State and National forests and large tracts that are privately owned. Many wooded areas, however, are producing far below their capabilities. Heavy cutting in the past, without planning for future timber crops, has resulted in understocked stands of mature trees. Forest fires have seriously damaged large trees, interfered with natural seeding, and destroyed the leaf litter that protected the soil from erosion. In farm woodlands grazing livestock have caused similar loss of valuable timber.

On abandoned fields small trees are becoming established that will eventually develop into timber, but many years are required before stands of commercially important species reach maturity. Crabapple, hawthorn, and sassafras are often the first species established; they are followed by slippery elm, black locust, red maple, oak, and hickory. On the better sites, yellow-poplar may seed in small areas and make a valuable first crop. On drier sites, pine may be the first species established

Approximately 18,500 acres of class VII land in Preston County should be returned to forest crops This land is now idle or is in steep, eroded pastures of poor quality. Forest trees should be planted on these areas to hasten the return of suitable timber. Red pine and white pine are suitable for the dry soils and the moist soils that are well drained. European larch and red spruce, the latter at higher elevations, are suitable for planting on poorly drained soils. Norway spruce and Scotch pine, on moist and dry soils, respectively, are suitable for production of Christmas trees.

[1] Dr. E. H. Tryon of the Forestry Department, Agricultural Experiment Station, West Virginia University, assisted in the preparation of this section of the report.

Forest Types

Preston County lies partly in the northern forest region and partly in the central hardwoods forest region. Consequently, a large number of species and several different forest types occur in the area. Hardwood species are predominant.

Yellow-poplar—white oak—red oak type.—This forest type occurs on bottom lands, mainly of the Sequatchie, Pope, and Philo series; on colluvial soils of the Shelocta, Ernest, and Clarksburg (reddish variant) series; and on the lower slopes of residual soils such as Gilpin, Calvin, Belmont, and Dekalb. It is commonly called the "cove hardwood" type and, in addition to yellow-poplar, white oak, and red oak, contains other valuable species. Among these are white ash, black walnut, and some sugar maple and basswood, as well as red maple and black cherry. Some small, pure stands of yellow-poplar are present.

Oak—hickory type.—This forest type occurs throughout much of the county in places where supplies of soil moisture are average; that is, in sites neither wet nor dry. Oaks and hickory are dominant. Also present in these stands are white ash, sugar maple, black locust, beech, yellow-poplar, and blackgum. They grow on Rayne, Wharton, Cavode, and similar soils.

Chestnut oak—scarlet oak—black oak type.—This type of forest occurs on the drier soils, mainly those of the Dekalb, Gilpin, and Calvin series. It occupies the upper slopes and crests of ridges but extends down the south slopes where there are shallow soils that dry out quickly. White oak, hickory, pitch pine, blackgum, and black locust are present in this forest type, along with the dominant chestnut oak, scarlet oak, and black oak.

Sugar maple—beech—yellow birch type.—This type is often referred to as "northern hardwoods." It occurs on moist soils in the higher eastern part of the county, mainly on the Belmont, Clarksburg (reddish variant), Ernest, and Shelocta soils. Sugar maple, beech, and yellow birch are dominant in the stand. Included are red maple, red oak, white ash, black cherry, basswood, and some white pine.

Hemlock type.—This type of forest occurs on moist colluvial soils, often in small isolated patches that are rocky. Associated with the hemlock are northern hardwood species at higher elevations and cove hardwood species at lower elevations. Because of the small area occupied by hemlock forest, it is not considered an important forest type in Preston County.

Pine type.—Pine forests are less abundant in Preston County than they were at the time of settlement. Limited stands of white pine, pitch pine, and Virginia pine are present, but they are generally associated with hardwoods.

Glades.—In the glade areas there is an association of trees not classified as a forest type. The glades support larch, red maple, black ash, trembling aspen, and some red spruce.

Factors Affecting Woodland Management

Soils differ greatly in their capabilities for woodland use, but the factors influencing such use are somewhat different from those that limit their use for more intensively managed crops. This soil survey can help the owner evaluate

the soils and decide where he can get the most return for his investment in woodland management. Studies show that trees on the best soil sites grow much more rapidly than on the poorer soils. An owner therefore can afford to give his woodlands very careful management on good soils. On the other hand, poor woodland soils can justify very little in the way of woodland management beyond the minimum needed to protect the watershed.

Of first importance among the factors that influence tree growth is the ability of the soil to supply moisture. The moisture-holding capacity of any soil largely depends on its slope, effective depth, texture, permeability, and internal drainage. The position on the slope and direction of exposure also limit the supply of moisture. Other factors important in evaluating a soil for use as woodland are degree of erosion, acidity, and inherent fertility. Some of the most important factors in woodland management and their significance in the classification of woodland sites are discussed in the following paragraphs.

Slope.—As slope increases, woodland management becomes more difficult. Runoff increases, the rate of infiltration decreases, and the hazard of erosion becomes greater. Soils, even in the same series, tend to be shallower on steeper slopes. In Preston County, three broad slope ranges have been used in the classification of woodland sites: 0 to 20 percent slopes, 20 to 40 percent slopes, and slopes greater than 40 percent.

Erosion.—Severe erosion causes the loss of surface soil and reduces the total thickness of soil, particularly that part where moisture is stored. In addition to this decrease in the effective depth of the soil, severe erosion removes the protective surface layer and exposes the heavier, less porous subsoil and thereby contributes to increased runoff and lower water intake. Both tree growth and natural reseeding are adversely affected by severe erosion. The effect of erosion is shown in the key to woodland sites (table 2). A severely eroded soil is less desirable for trees than an uneroded soil of the same series and on the same slope.

Slope position.—The position of woodland sites on long slopes is important in determining moisture supply for tree growth (table 2). Both the surface and underground supply of water increase with increasing distance down the slope from ridge crests. Soils on the lower slopes also have greater depths than those near the crests of ridges. Loss of soil moisture through evaporation is less on the foot slopes than near the ridgetops.

In classifying woodland, areas that occupy long, steep hillsides can be separated according to their position as (1) upper slopes; (2) middle slopes; and (3) lower slopes. Lower slopes terminate either at the edges of streams or their flood plains or at the edges of colluvial areas.

Some soils always occur in about the same topographic positions. For example, soils of the Clymer and Rayne series are always on fairly broad, gentle slopes, and soils of the Shelocta and Ernest series always occupy the lower third of the slopes, or the colluvial slopes. Other soils occur in more than one slope position, as is shown in table 2.

Aspect or direction of exposure.—Forest studies show a definite relationship between the exposure of a site and the rate of growth.[2] Trees generally grow better on slopes facing north and east than on slopes facing south and west. Soil moisture is better on slopes facing north and east than on slopes facing south and west. Although all the factors involved in exposure are not fully understood, some that play an important role are (1) differences in the rates of evaporation as influenced by the prevailing winds, (2) length of time the snow cover remains on the ground, (3) amount of freezing and thawing, and (4) differences in soil temperatures.

In defining exposure, slopes that face in a northerly or easterly direction in relation to a true northwest-southeast line are designated northeast slopes; slopes facing in a southerly or westerly direction in relation to the northwest-southeast base line are designated southwest slopes.

Soil reaction and soil fertility.—These factors have some influence on the growth and adaptation of different species of trees. For example, walnut trees and locust trees do best on calcareous soils. Fertility alone seems to be of little significance in Preston County. In some parts of West Virginia, however, the growth of trees is consistently poor on soils of low fertility.

Woodland Sites

The soil types and miscellaneous land types of Preston County have been placed in four major classes, or woodland sites, according to their inherent ability to produce forest crops. Their expected productivity was determined through use of the oak-site index. This index is based on the average height of a normal stand of oak when it is 50 years old. Foresters using this index can determine the volume of timber that normal stands will produce at different ages.

Table 2 is a key to the woodland sites of Preston County. This table will help you determine the site classification for any tract of land, providing you know the soil, the position of the tract on the slope (upper, middle, or lower third, if applicable), and the direction of exposure. Suppose you have an area of Gilpin silt loam, 20 to 30 percent slopes, that lies on the upper third of a long slope facing north. Find Gilpin silt loam in the first column of the table. In the second column select the horizontal line which corresponds to the upper-third slope designation and read across to the column that has the 20 to 40 percent slope range and a northeast exposure. Thus, Gilpin silt loam, 20 to 30 percent slopes, is site F2 woodland. The procedure is the same for severely eroded soils but one site class must be added to the class indicated in the table. Thus, Gilpin silt loam, 20 to 30 percent slopes, severely eroded, with the same slope position and same direction of exposure, is site F3 woodland.

In the following paragraphs the four woodland sites are described, their management is discussed, and yields to be expected from well-stocked stands are estimated.

SITE F1: EXCELLENT LAND FOR TIMBER PRODUCTION.—Soils in site F1 have an oak-site index of 75 or better. The expected yield is 13,750 board feet per acre when the stand is 50 years of age. This site can produce good-quality forest that justifies intensive management. Although some steep slopes and stony land are included, returns from the site compensate for the careful management of these included areas. Natural reproduction is good in open areas where a source of seed is available. There are approximately 74,789 acres in this site.

[2] WEITZMAN, SIDNEY AND TRIMBLE G. R. JR. A CAPABILITY CLASSIFICATION FOR FOREST LAND. Jour. Soil and Water Conserv. 10: 228–232, illus. 1955.

TABLE 2.—*Key to woodland sites*

Uneroded soil type [1]	Slope position	Slope range and direction of exposure					
		0 to 20 percent		20 to 40 percent		Over 40 percent	
		NE	SW	NE	SW	NE	SW
Clymer gravelly loam Clymer loam Rayne silt loam	[2]	F1	F2				
Clarksburg silt loam, reddish variant Ernest silt loam Ernest stony silt loam Shelocta silt loam	[2]	F1	F1	F1	F2		
Cookport silt loam Cookport stony silt loam Monongahela silt loam Wharton silt loam	[2]	F1	F2	F2	F3		
Calvin silt loam Dekalb loam Dekalb stony loam Gilpin channery silt loam Gilpin silt loam Gilpin stony silt loam	Lower third	F1	F2	F1	F2	F1	F2
	Middle third	F1	F2	F2	F3	F2	F3
	Upper third	F2	F3	F2	F3	F3	F4
Belmont silt loam Belmont stony silt loam Upshur silty clay loam	Lower third	F1	F2	F1	F2	F1	F3
	Upper third	F1	F3	F2	F3	F3	F4
Dekalb channery sandy loam Dekalb stony sandy loam	Lower third	F2	F3	F2	F3	F2	F4
	Middle third	F2	F3	F2	F4	F3	F4
	Upper third	F3	F4	F3	F4	F4	F4
Philo silt loam Pope fine sandy loam Pope gravelly silt loam Pope silt loam Sequatchie fine sandy loam	[2]	F1	F1				
Brinkerton silt loam Brinkerton stony silt loam Cavode silt loam Tyler silt loam	[2]	F2	F3				
Atkins silt loam Atkins silty clay loam Elkins silty clay loam Lickdale silty clay loam Lickdale stony silty clay loam Melvin silt loam Mixed alluvial land	[2]	F4	F4				

[1] For severely eroded soils add one class to sites F1, F2, and F3; thus, F1 becomes F2, F2 becomes F3, and F3 becomes F4.

[2] Slope position is same for all soils in the group, or slope does not affect the site designation for soils in the group.

SITE F2: GOOD LAND FOR TIMBER PRODUCTION.—Soils in site F2 have an oak-site index of 65 to 74. The expected yield is 9,750 board feet per acre when the stand is 50 years old All trees, native or introduced, grow less favorably than on site F1. Nevertheless, when well stocked, the productivity of these areas justifies intensive management. Such management requires that logging roads be built on controlled grades and that adequate provision be made to spread water and control erosion. There are approximately 76,028 acres in this site.

SITE F3: FAIRLY GOOD LAND FOR TIMBER PRODUCTION.—Soils in site F3 have an oak-site index of 55 to 64. The expected yield is 6,300 board feet per acre when the stand is 50 years old. Growth rates are fairly slow on this site, but good species can be grown. Most areas are steep, and in many places the soils are shallow or only moderately deep. These areas must be protected from erosion during cutting operations. There are approximately 60,742 acres in this site.

SITE F4: POOR LAND FOR TIMBER PRODUCTION.—Soils in this site have an oak-site index of 54 or below. The expected yield is less than 3,250 board feet per acre when the stand is 50 years old. This site should be kept in trees to protect the watershed and to provide protection and food for wildlife. Tree growth is too slow and forest crops are too poor to justify timber production. The soils are shallow, droughty, and steep and usually occupy ridges that have a southerly or westerly exposure. Over long periods of time, mine props, pulpwood, and low-grade lumber can be obtained. There are approximately 24,864 acres in this site.

Reclamation of Strip-Mine Areas

Before World War II only a few small areas of iron ore and some coal were strip mined in Preston County. During World War II, strip mining of coal became an important industry. Approximately 2,500 acres of land have been strip mined since 1940.[3]

[3] Includes an estimated 525 acres that have been strip mined since the fieldwork for this soil survey was completed. These areas are not shown on the soil map

Strip-mined areas follow the contour of coal outcrops. On steep slopes, single cuts usually are made. These cuts range up to a mile or more in length but in many places are less than 300 feet wide. On the more gentle slopes, series of parallel cuts are often made. These cuts generally have greater widths than those on steeper slopes. The last cut in a mined area may have a vertical wall as much as 50 feet high. The outer slope gradient of the strip-mined area, in most places, is 70 to 80 percent.

State laws require that strip-mined land that was once in agricultural use be regraded and that coal seams be covered and the area planted or seeded to some type of vegetation. The first efforts at regrading were aimed at restoring the original topography, but severe erosion of the unconsolidated soil and rock material resulted. In recent years, recommendations call for bench terraces graded in such a way that drainage from the main terraced areas will flow back toward the highwall.

After grading, spoil material is extremely variable in the proportion of soil and rock and in the texture of the finer materials. Most of the rocks are sandstones, or shales that have reactions ranging from extremely acid to calcareous. In a few places limestone is present The acidity of the spoil material often varies sharply within a distance of a few feet. Sulfuric acid, released through the breakdown of pyritic material, contributes to the acidity of many spoil areas and causes the extreme acidity of small spots a few feet in diameter. Stoniness of spoil material also varies greatly. Large stones ordinarily are covered during the grading of level areas, but they occur on the surface of outer slopes and are very numerous near the foot of such slopes.

Spoil material overlying the Barkerstown coal seams usually breaks down to form slightly acid to alkaline soil materials of silty texture. But dependable correlation between a particular coal seam and the type of spoil cannot be made.

Reclamation of strip-mined areas has been studied by the West Virginia Agricultural Experiment Station. The studies show that all except the extremely acid and extremely steep areas can be revegetated with trees, shrubs, grasses, and legumes.[4]

During the soil survey, spoil materials were studied and placed in three groups according to their reaction, texture, rockiness, and slope.

GROUP I SPOIL: This material has a pH value of 5.5 or more. Stones are neither so large nor so numerous that they prevent the use of farm implements. Textures near the surface are as fine as silty clay loam, but they do not interfere with the infiltration of water. Level areas are severely limited as cropland but produce satisfactory stands of grasses suitable for hay, such as alfalfa and similar legumes, and of orchardgrass. Spoil of this kind may be considered class IV land in the land capability classification.

Ungraded areas and the outer slopes of graded areas, where not too steep, are class VII land. Satisfactory stands of locust and white and red pines can be grown on these areas.

The steep outer slopes, or class VIII land, can be stabilized, at least partially, by broadcast seedings of suitable grasses and legumes. Growth of native trees and weeds should be encouraged by protecting the areas from grazing and burning

GROUP 2 SPOIL: This material has pH values between 4.0 and 5 5. A few extremely acid spots, caused by the breakdown of pyritic material, may be present. This group also includes areas that have heavy clay textures and areas that are too stony to be classed as group 1 spoil. Because of its acidity, heavy texture, and almost complete lack of organic matter and micro-organisms, this material should be considered class VII or class VIII land, depending upon stoniness and slope. On level areas, leaching may reduce the acidity of the spoil material to the point where grasses and legumes can be grown successfully. The trees mentioned in group 1 spoil and the more tolerant pines, such as Scotch and Virginia, are best suited to these spoil areas. Areas so steep that trees cannot be planted ought to be kept seeded to grasses and legumes that resist drought and tolerate acidity.

GROUP 3 SPOIL: This material has a pH value below 4.0. In some areas there are numerous "slick spots" caused by the breakdown of pyritic material. Because the spoil is extremely acid, it is toxic to practically all plants and cannot support productive vegetation. For this reason, group 3 spoil is class VIII land.

This spoil generally does not occur as uniformly acid areas. It is mixed in an intricate pattern with better spoil material. Plants that tolerate acidity can be established on the less acid spots, but the spoil should be allowed to leach for several years before attempts are made to establish vegetation. Numerous pH tests in the area and exploratory, or site-testing, seeding will help to delineate more accurately the pattern of the spoil.

Engineering Properties of the Soils[5]

This soil survey report contains information about the soils of Preston County that will be helpful to engineers in selecting sites for buildings and other structures; in choosing locations for highways and airports; in determining the trafficability of soils; in locating sand and gravel for use in construction; and in planning dams, ponds, and other structures to control floods and conserve soil and water.

Even though the soil maps and accompanying report are too generalized for some engineering purposes, they provide information valuable in planning detailed field surveys and tests to determine the in-place condition of soils at proposed sites for construction. After testing the soil materials and observing their behavior in place and under varying conditions, the engineer can anticipate to some extent the properties of individual soil units wherever they are mapped.

Engineering Data

Some of the information about soils that engineers need can be obtained from the soil maps and from table 3. This table lists some of the in-place properties of the soil types mapped in Preston County. It was prepared mainly for agricultural engineering, but it includes information important to other fields of engineering. Other information and data can be obtained by referring

[4] TYNER, E. H., SMITH, R M., and GALPIN, SIDNEY L. RECLAMATION OF STRIP-MINED AREAS IN WEST VIRGINIA. Jour. Amer. Soc. Agron. v. 40, No. 4, 1948.

[5] HAROLD M. RHODES, State conservation engineer, SCS, assisted in preparing this section.

TABLE 3.—*Soil properties*

Soil type	Depth to bedrock	Kind of rock [1]	Internal drainage	Dominant texture	
				Surface soil	Subsoil
	Feet				
Atkins silt loam	[3] 3–10+	Sandstone and shale	Poor	Silt loam	Silt loam and silty clay.
Atkins silty clay loam	[3] 3–10+	Sandstone and shale	Poor	Silty clay loam	Silty clay
Belmont silt loam and stony silt loam.	2–5	Shale, sandstone, and limestone.	Good	Silt loam	Silty clay loam
Brinkerton silt loam and stony silt loam.	5–10+	Shale and sandstone	Somewhat poor to poor.	Silt loam	Silty clay loam
Calvin silt loam	2–4	Siltstone, shale, and thin sandstone.	Good	Silt loam	Silt loam and silty clay loam.
Cavode silt loam	3–5	Clay shale and fire clay.	Somewhat poor	Silt loam	Silty clay loam and clay.
Clarksburg silt loam, reddish variant.	4–10+	Shale and sandstone	Moderately good	Silt loam	Silty clay loam
Clymer loam and gravelly loam	3–5	Sandstone	Good	Loam to sandy loam	Silt loam to sandy loam.
Cookport silt loam and stony silt loam.	3–5	Sandstone	Moderately good	Silt loam	Silt loam and sandy loam.
Dekalb loam, channery sandy loam, stony loam, and stony sandy loam.	2–5	Sandstone	Good	Loam to sandy loam	Loam to sandy loam.
Elkins silty clay loam	[3] 3–10+	Sandstone and shale	Very poor	Silty clay loam	Silt loam to silty clay loam.
Ernest silt loam and stony silt loam.	8–20+	Sandstone and shale	Moderately good	Silt loam	Silty clay loam
Gilpin silt loam, channery silt loam, and stony silt loam.	2–5	Shale, sandstone, and siltstone	Good	Silt loam	Silt loam and silty clay loam.
Lickdale silty clay loam and stony silty clay loam.	3–8	Sandstone and shale	Very poor	Silt loam and silty clay loam.	Silt loam and silty clay loam.
Melvin silt loam	[3] 3–8+	Sandstone and shale	Poor	Silt loam to fine sandy loam.	Sandy loam to silty clay loam.
Mixed alluvial land	3–8	Sandstone and shale	Variable	Variable	Variable
Monongahela silt loam	[3] 5+	Sandstone and shale	Moderately good	Silt loam	Silt loam
Philo silt loam	[3] 4+	Sandstone and shale	Moderately good to somewhat poor.	Silt loam	Loam to fine sandy loam.
Pope silt loam, gravelly silt loam, and fine sandy loam.	[3] 4+	Sandstone and shale	Good	Silt loam to fine sandy loam.	Silt loam to sandy loam.
Rayne silt loam	3–5	Shale and sandstone	Good	Silt loam	Silt loam to silty clay loam.
Sequatchie fine sandy loam	[3] 8+	Sandstone and shale	Good	Fine sandy loam	Loam to fine sandy loam.
Shelocta silt loam	8–20+	Sandstone and shale	Good	Silt loam	Silt loam to sandy loam.
Tyler silt loam	[3] 5+	Sandstone and shale	Somewhat poor	Silt loam	Silty clay loam to clay.
Upshur silty clay loam	2–4	Clay shale	Good	Silty clay loam	Clay
Wharton silt loam	3–5	Clay shale	Moderately good	Silt loam to silty clay loam	Silty clay loam to clay.

[1] Only the dominant kind of rock is given; most of the rock formations contain interbedded strata possessing other textural characteristics.

[2] See text for explanation of rating system.

[3] Depth to bedrock may be as much as 15 to 20 feet under terrace and floodplain soils.

important in engineering

Permeability of subsoil	Rate of infiltration [2]	Drainage problems	Suitability for ponds [2]	Other remarks
Moderately slow to very slow.	Low	High water table, soil only slowly permeable.	Good (sandy layers).	Some areas subject to floods.
Very slow	Very low	High water table, soil only slowly permeable.	Good (sandy layers).	Some areas subject to floods.
Moderate	Medium	None	Poor (limestone)	Occasional seeps; note stony soils
Slow	Very low	Soils slowly permeable; subject to seepage.	Very good	Diversions required to intercept surface and subsurface water; note stony soils.
Moderate	Medium	None	Fair (sandstone)	Some seep spots occur.
Slow to very slow	Low	Claypan prevents free drainage, seepage may occur.	Good	Perched water table over claypan.
Moderate to slow	Low	Deep claypan; only slight drainage problem.	Good	Diversions required to intercept surface and subsurface water. Small seep spots are common.
Rapid	High to medium	None	Poor (sandstone)	Note gravelly soils
Slow in pan	Medium to low	Perched water table over claypan.	Poor (sandstone)	Note stony soils.
Rapid	High	None	Poor (sandstone)	Note stony soils
Slow to very slow	Very low	High water table; soils only slowly permeable.	Good	Some sandy layers are present.
Slow in pan	Medium to low	Subject to seepage on hillsides where claypan is present	Very good	Note stony soils
Moderate	Medium	None	Fair (sandstone)	Note channery and stony soils.
Very slow	Very low	High water table; soils only slowly permeable; seepage on hillsides.	Very good	Note stony soils.
Slow	Low	High water table; soils only slowly permeable	Fair	Variable texture, depth of soil, and drainage; subject to floods.
Variable	Low	High water table		Variable texture, drainage, and gravel content; subject to floods.
Slow in pan	Medium to low	Slight drainage problem caused by claypan	Fair	Some layers of sand and gravel are present in the subsoil.
Moderately slow	Medium to low	Slight drainage problem caused by high water table	Fair	Some sandy layers are present; subject to some flooding.
Moderate to rapid	Medium	None	Poor	Some sandy layers are present; subject to some flooding.
Moderate	Medium	None	Fair (very few sites).	
Moderate to rapid	High	None	Poor	Sandy and gravelly layers are present below depths of 3 feet
Moderate	Medium	None	Good	Claypan may be present at depths of 4 to 6 feet.
Very slow	Very low	Water stands on surface where claypan layer is present.	Good	Very small acreage.
Slow	Low	Some seeps occur	Good	Slips occur; volume changes in the clay; and the shale weathers quickly
Slow	Medium to low	Perched water table over claypan areas.	Good	Some seeps occur

to other sections of the report, particularly to the sections entitled The Soils of Preston County, General Nature of the Area, and Genesis and Morphology of Soils.

Some of the terms used by the soil scientist may not be familiar to the engineer, and other terms, though familiar, have special meanings in soil science. The terms used in table 3 and other special terms used in the soil survey report are defined in the section, Soil Survey Methods and Definitions.

Under rate of infiltration in table 3 it should be pointed out that the soils of Preston County have been ranked according to their ability to take in water during periods of sustained rainfall. The ranking is based on the whole soil profile and underlying unconsolidated parent material, and it assumes the soils to have natural drainage and a uniform plant cover. The rating is entirely relative and uses Rayne silt loam—a deep, medium-textured, moderately permeable soil—as the basis for comparison. The rate of infiltration for Rayne silt loam is considered medium. Soils may have a high, medium, low, or very low rate of water infiltration.

In determining the suitability of soil materials for constructing ponds, the compactability of the soils and the porosity of the underlying bedrock were both considered.

Many soils in Preston County contain rock fragments that make excavation difficult with some types of equipment or that prevent the use of tamping rollers to compact materials placed in embankments. The large fragments must be crushed or removed to make the materials suitable for use in foundation or base courses for pavements of roads that will carry a high to moderate volume of traffic with heavy axle loads. The fragments must also be crushed or removed if the material is used as a pavement for county roads that are to carry only slight traffic.

In road building it is particularly important to know the location of poorly drained soils. Seepage along the backslope of cuts in these areas may result in slumping or sliding of the overlying material. A perched water table beneath a road pavement may encourage freezing and thawing in the saturated foundation material. This, in turn, causes differential volume changes and differences in bearing capacity. Poorly drained areas should be inspected in greater detail to determine the need for interceptor drains and underdrains.

Poorly drained soils, especially if they are high in organic matter, are severely limited for most types of construction. Where cuts are made in poorly drained areas, the excavated material should not be used as fill for embankments. Suitable fill from other areas should be used for embankments and for foundations below gradeline in the cuts.

Information about the textural characteristics and parent materials of soils will be useful in locating materials for construction purposes. Soil materials that have a high percentage of silt and clay particles are very susceptible to frost action. Coarse-grained materials are less susceptible to frost action and therefore are more suitable for use in the upper parts of subgrades and for pavement foundations.

The Soils of Preston County

Shown on the large soil map at the back of this report are 116 different soils and miscellaneous land types. To understand these soils, it will be necessary to learn some of the terms used in describing them. The first part of this section provides these definitions. In the pages following these definitions, the soil series (groups of single soils that are basically alike) and the soils in each of these series are described.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines the soils in the field, classifies them in accordance with facts that he observes, maps their boundaries on an aerial photograph or other map, and describes them in his report.

The soil scientist bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern; they are located according to the lay of the land. Most of them are not more than a quarter of a mile apart, and some are much closer. In most soils each boring, or hole, reveals several distinct layers, called horizons, which collectively are known as the soil profile (fig. 5). Each layer is studied to see how it differs from others in the profile and to learn things about the soil that will influence its capacity to support plant growth.

Most of the words scientists use in describing soils are familiar words, but they have special meanings in soil science. Some of the words and terms most commonly used in soil reports are discussed in the following pages.

Color is expressed in words and in Munsell notations; for example, gray (10YR 5/1). The Munsell notations record color more exactly than can be done in words and are primarily for the use of soil scientists. Unless otherwise stated, the color given for a soil is its color when moist. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers. The texture is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate. Soils that are rich in clay or in organic matter have greater reserves of acidity or alkalinity than sandy soils or those low in organic matter. A soil with a high capacity or reserve is said to be well buffered.

MEDIUM TEXTURES—loam and silt loam—feel smooth and floury when rubbed between the fingers. Soils having these textures are ideal for most purposes and are often referred to as loamy soils.

FINE (OR HEAVY) TEXTURES—silty clay loam, silty clay, clay loam, and clay—are plastic when moist and will form a ribbon. When rubbed between the fingers soils of these textures appear slightly polished. These soils contain a high amount of clay (more than 27 percent). They dry out slowly after rains, and if worked when too wet they puddle and become hard and cloddy. Plant nutrients do not leach so rapidly from these soils as they do from the light-textured or sandy soils.

MODERATELY COARSE (OR LIGHT) TEXTURES—fine sandy loam and sandy loam—feel sandy or gritty when rubbed between the fingers and will not form a ribbon. Soils of these textures dry out quickly after rains and warm up early in spring. They are easy to work but do not hold moisture so well as soils with medium textures.

The terms "gravelly," "channery," and "stony" are used as modifiers before the soil texture name. The

term "gravelly" is used when more than 20 percent of the soil, by volume, consists of rounded stones ½ inch to 3 or 4 inches in diameter. The term "channery" refers to thin, flat stones up to about 6 inches long. The term "stony," as used in this report, applies to soils in which stones are either so numerous or so large that they severely limit or prevent the use of farm machinery.

Structure, which is the way the individual soil particles are arranged in larger aggregates and the amount of pore space between grains, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture. For example, a claypan 18 inches below the surface may limit the growth of roots to a shallow surface layer and make the plants more susceptible to damage during prolonged drought. Structure is defined in terms of distinctness, size, and shape of soil aggregates. For example, "moderate medium subangular blocky" means *moderately distinct, medium-sized* aggregates of subangular blocky *shape.*

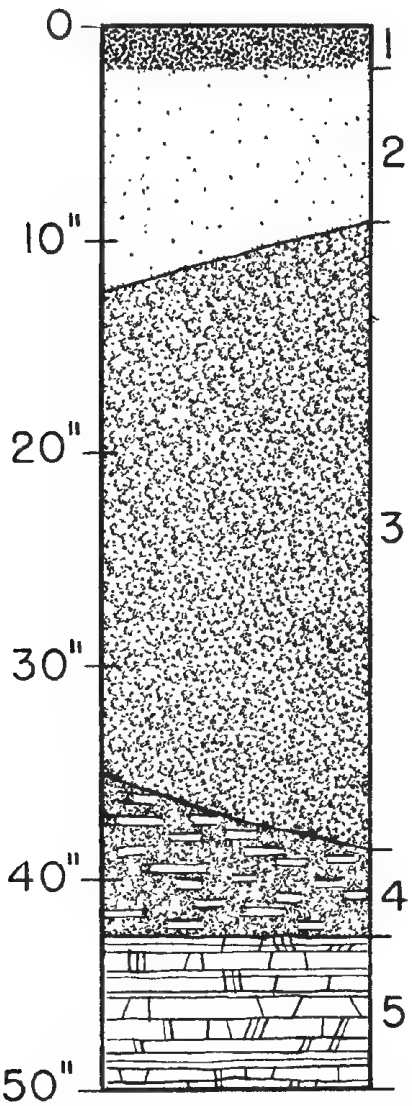

***Figure 5.*—Typical soil profile showing desirable properties of the different layers:**

1. **Dark-gray silt loam containing considerable organic matter; granular structure; water infiltrates readily; feels mellow.**
2. **Brownish-yellow silt loam; breaks easily into small soft crumbs; well drained and well aerated; holds moisture well; easily worked.**
3. **Brownish-yellow heavy silt loam; uniformly bright color indicates good aeration; breaks into small angular or slightly rounded blocks; particles are easily crushed; slightly plastic when moist; slightly less permeable than above layer; holds moisture well.**
4. **Silty clay loam; lacks definite structure; contains considerable sand and many partially weathered stone fragments.**
5. **Gray, thin-bedded sandstone and shale.**

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation. Consistence is described according to how sticky or how plastic the soils are when wet; how friable or firm they are when moist; and how soft or hard they are when dry. If moisture conditions are not stated in using any consistence term, the moisture condition is that under which the particular term is defined. Thus, "friable," used without a statement of moisture content, means friable when moist; "hard," if used alone, means hard when dry; and "plastic," used alone, means plastic when wet.

Permeability refers to the rate at which water or air can move through the soil. As used in this report, it usually refers to movement in the lower part of the subsoil.

Rapidly Permeable Soils dry out quickly after rains and are inclined to be droughty. Plant nutrients leach more readily from these soils than from those with moderate or slow permeability.

Moderately Permeable Soils drain readily so that the root zone is well aerated, but the soil holds a good amount of moisture for plant growth.

Slowly Permeable Soils are likely to be waterlogged in winter and early in spring. Poor internal drainage is often, but not necessarily always, associated with soils that are slowly permeable. The Upshur soils are slowly permeable and have good internal drainage. They have a high rate of surface runoff Atkins silt loams are slowly permeable and have poor internal drainage. They require artificial drainage, but water moves so slowly in these soils that drains must be placed close together to provide adequate drainage.

Very Slowly Permeable Soils have tight layers and normally a high clay content. Water moves very slowly and the soils are poorly aerated. Plant roots seldom penetrate the claypan layer. Water stands on these soils for long periods. Tile drains are not effective in these soils, so surface drainage usually must be provided.

Internal drainage refers to the downward movement of excess water in the soil and is related to the frequency or duration of periods when the soil is saturated. The height of the water table affects internal drainage. Mottling, or small patches of gray, yellow, and reddish-brown colors, indicates restricted internal drainage. Although mottling is usually associated with soils that are slowly permeable, it may occur where the soil has been saturated for a long time by a high water table. The following drainage classes are used in this report:

Well Drained Soils show no significant mottling in their profile; colors are bright and uniform throughout. In the Rayne soils the slight gray and yellow splotches are pieces of weathered sandstone and shale.

Moderately Well Drained Soils show signs of mottling at depths ranging from 15 to 30 inches from the surface, but the upper part of their profile has bright, uniform colors.

Poorly Drained Soils have pale-yellow or gray surface layers, and strong mottling occurs in a range of from 0 to 10 inches from the surface

Very Poorly Drained Soils have dark-gray to almost black surface layers, and mottling is intense within 3 to 4 inches of the surface. Sedges and other swamp plants are the main

vegetation growing on these soils. Water stands on the surface or is within a few inches of it during most of the year.

Effective depth refers to the thickness of that part of the soil in which water and plant nutrients are readily stored and plant roots readily penetrate. An effective depth of 3 or 4 feet is adequate for most crops. In this report depth ranges are defined as follows:

DEEP: 36 inches or more.
MODERATELY DEEP: 20 to 36 inches.
SHALLOW: 20 inches or less.

Slope is the amount of rise, in feet, for each 100 feet of horizontal distance. It is normally measured with a hand level and is expressed as a percent. A slope of 45° is a slope of 100 percent, since two points 100 feet apart have 100 feet difference in elevation. As slopes become steeper, the hazard of erosion becomes greater. If other factors are equal, the loss of soil on a 12 percent slope is about three times as great as the loss on a 5 percent slope. Slope also influences soil development and limits farming operations. Most of the soils of Preston County have been placed in one of the following slope categories:

NEARLY LEVEL: 0 to 3 percent slopes.
GENTLY SLOPING: 3 to 10 percent slopes.
MODERATELY SLOPING: 10 to 20 percent slopes.
MODERATELY STEEP: 20 to 30 percent slopes.
STEEP: 30 to 40 percent slopes.
VERY STEEP: 40 percent slopes or greater.

Erosion, as used in this report, refers mainly to accelerated erosion, which is loss of soil brought about by man's activities; that is, erosion that has taken place since man began using the land and changing the plant cover. To establish the erosion classes, the relatively uneroded soils in woodlands, fence rows, and other protected places were compared with soils of the same type in areas that were cultivated or altered in some way by man. The following classes were defined:

NONE TO SLIGHT: More than three-fourths of the original surface soil is present. Subsoil material has not been mixed with the plow layer, and there is little evidence of rill or gully erosion. Forest areas that have not been seriously damaged by burning or grazing are placed in this class. The soils of the bottom lands that gain as much water-moved material as they lose are also in this class.

MODERATE: From one-fourth to three-fourths of the original surface soil has been removed, the plow layer is a mixture of the original surface soil and the subsoil. Textures generally are silty. Rills may occur in cultivated areas, and there may be some shallow gullies. The surface soil is deep enough for most crops, and tilth is easily maintained if good conservation practices are applied

SEVERE: More than three-fourths of the original topsoil and, in some places, all of the original topsoil and part of the subsoil have been removed. The characteristics of the plow layer are mainly those of the subsoil. Rill erosion is apparent in many places. Numerous shallow gullies and some deep gullies are present.

In mapping the soils, the first two erosion classes—none to slight, and moderate—were considered as one class, because continued erosion is not a problem on soils in either erosion class if good conservation practices are applied in farming them.

In Preston County there are about 17,000 acres of severely eroded soils. At the time of the soil survey, this severely eroded acreage was used about as follows: Cropland, 6,500 acres; permanent pasture, 7,600 acres; second-growth woodland, 1,300 acres; idle land, 1,500 acres; and miscellaneous uses, the remaining acreage. Most of the pasture had been cropland at some time in the past. The second-growth woodland was established following the abandonment of severely eroded cropland and pasture.

Other characteristics observed in the course of the field study and considered in classifying the soils include the nature of the underlying parent material from which the soil developed and the acidity or alkalinity of the soil as measured by chemical tests.

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified by phases, types, and series.

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Soil phase.—Because of differences other than those of kind, thickness, and arrangement of layers, some soil types are divided into two or more phases. Slope variations, frequency of rock outcrops, degree of erosion, depth of soil over the substratum, and stoniness are examples of characteristics that suggest dividing a soil type into phases.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices therefore can be specified more precisely than for soil series or yet broader groups that contain more variation.

Soil series.—Two or more soil types that differ in texture of the surface layer but are otherwise similar in kind, thickness, and arrangement of soil layers are normally designated as a soil series. In a given area, however, a soil series may be represented by only one soil type. Each series is named for a place near which it was first mapped.

As an example of soil classification, consider the Rayne series of Preston County:

Series	*Type*	*Phase*
Rayne	Silt loam	3 to 10 percent slopes.
		3 to 10 percent slopes, severely eroded
		10 to 20 percent slopes.
		10 to 20 percent slopes, severely eroded.

The Rayne series in this county has only one soil type. This type consists of four phases.

Miscellaneous land types.—Areas that have little true soil are not classified by types and series. Instead, they are identified by descriptive names such as Made land (Ma), Mine dumps (Mb), Mixed alluvial land (Md), and Strip-mine spoil (Se).

Soil Descriptions

This subsection is provided for those who want detailed information about soils. It describes the single soils, or mapping units, in the county; that is, the areas on the detailed soil map that are bounded by lines and identified by a letter symbol. For more generalized information about soils, the reader can refer to the subsection, General Soil Areas, in which the broad patterns of soils are explained.

In this subsection the soils are described in approximately alphabetic order. All the soils of one series that have the same texture in the surface layer are together. For example, all the Gilpin soils that have a silt loam sur-

face soil come together, and then, all the Gilpin soils that have a channery silt loam surface soil.

Ordinarily, only one soil is described in detail for each series. An important part of this description is the soil profile, a record of what the soil scientist saw and learned when he dug into the ground. It is to be assumed that all the other soils in a series will have essentially the same kind of profile. The differences, if any, will be in texture of the surface soil or in thickness of the surface soil. To illustrate, a detailed profile is given for Gilpin silt loam, 10 to 20 percent slopes, and the reader is to conclude that all the other Gilpin soils have essentially this kind of profile. The differences, if any, are explained.

In describing soils, the scientist frequently assigns a letter symbol, for example, "A_1," to the various layers. These letter symbols have special meanings that concern scientists and others who desire to make a special study of soils. Most readers will need to remember only that all letter symbols beginning with "A" are surface soil; those beginning with "B" are subsoil; those beginning with "C" are substratum, or parent material; and those beginning with "D" are underlying rock or material.

Following the name of each soil, or mapping unit, is a set of symbols in parentheses. These identify the soil on the detailed map. The description that follows these symbols points out slope, erosion, and similar properties that distinguish this particular soil from the others. Frequently, the characteristics emphasized for a single soil are those that directly affect its management. For example, there are nine soils in the Gilpin series that have a silt loam surface layer and are similar in profile, but these soils differ in slope, a characteristic that affects their management.

The location and distribution of the single soils are shown on the soil map at the back of this report. Their approximate acreage and proportionate extent are given in table 4. It will be helpful to refer to the preceding subsection, Soil Survey Methods and Definitions, where "series," "type," "phase," and other special terms used in describing soils are listed.

TABLE 4.—*Approximate acreage and proportionate extent of soils and miscellaneous land types*

Soil or miscellaneous land type	Acres	Percent
Atkins silt loam	3,854	0.9
Atkins silty clay loam	779	.2
Belmont silt loam, 3 to 10 percent slopes	469	.1
Belmont silt loam, 10 to 20 percent slopes	977	.2
Belmont silt loam, 20 to 30 percent slopes	1,080	.3
Belmont silt loam, 30 to 40 percent slopes	347	.1
Belmont silt loam, 40 to 65 percent slopes	140	(1)
Belmont stony silt loam, 10 to 20 percent slopes	207	.1
Belmont stony silt loam, 20 to 30 percent slopes	282	.1
Belmont stony silt loam, 30 to 40 percent slopes	272	.1
Brinkerton silt loam, 0 to 3 percent slopes	1,560	.4
Brinkerton silt loam, 3 to 10 percent slopes	2,792	.7
Brinkerton stony silt loam, 0 to 15 percent slopes	1,259	.3
Calvin silt loam, 3 to 10 percent slopes	1,662	.4
Calvin silt loam, 10 to 20 percent slopes	4,276	1.0
Calvin silt loam, 10 to 20 percent slopes, severely eroded	524	.1
Calvin silt loam, 20 to 30 percent slopes	3,538	.8
Calvin silt loam, 20 to 30 percent slopes, severely eroded	695	.2
Calvin silt loam, 30 to 40 percent slopes	8,196	2.0
Calvin silt loam, 30 to 40 percent slopes, severely eroded	778	.2
Calvin silt loam, 40 to 65 percent slopes	5,584	1.4
Calvin silt loam, 40 to 65 percent slopes, severely eroded	375	.1
Cavode silt loam, 3 to 10 percent slopes	3,165	.8
Cavode silt loam, 3 to 10 percent slopes, severely eroded	113	(1)
Cavode silt loam, 10 to 20 percent slopes	1,494	.4
Clarksburg silt loam, reddish variant, 3 to 10 percent slopes	1,662	.4
Clarksburg silt loam, reddish variant, 10 to 20 percent slopes	507	.1
Clymer gravelly loam, 3 to 10 percent slopes	243	.1
Clymer loam, 0 to 3 percent slopes	131	(1)
Clymer loam, 3 to 10 percent slopes	2,904	.7
Clymer loam, 10 to 20 percent slopes	394	.1
Cookport silt loam, 3 to 10 percent slopes	139	(1)
Cookport stony silt loam, 5 to 20 percent slopes	1,858	.5
Dekalb channery sandy loam, 3 to 10 percent slopes	770	.2
Dekalb channery sandy loam, 10 to 20 percent slopes	788	.2
Dekalb channery sandy loam, 20 to 30 percent slopes	450	1
Dekalb channery sandy loam, 30 to 40 percent slopes	131	(1)
Dekalb channery sandy loam, 40 to 65 percent slopes	132	(1)
Dekalb loam, 3 to 10 percent slopes	2,481	.6
Dekalb loam, 10 to 20 percent slopes	2,724	.7
Dekalb loam, 10 to 20 percent slopes, severely eroded	301	.1
Dekalb loam, 20 to 30 percent slopes	1,314	.3
Dekalb loam, 20 to 30 percent slopes, severely eroded	187	(1)
Dekalb loam, 30 to 40 percent slopes	310	.1
Dekalb loam, 30 to 40 percent slopes, severely eroded	94	(1)
Dekalb stony loam, 5 to 20 percent slopes	3,026	.7
Dekalb stony loam, 20 to 30 percent slopes	2,209	.5
Dekalb stony loam, 30 to 40 percent slopes	2,480	.6
Dekalb stony loam, 40 to 65 percent slopes	1,860	.5
Dekalb stony sandy loam, 5 to 20 percent slopes	12,003	2.9
Dekalb stony sandy loam, 20 to 30 percent slopes	7,969	1.9
Dekalb stony sandy loam, 30 to 40 percent slopes	11,092	2.7
Dekalb stony sandy loam, 40 to 65 percent slopes	8,911	2.2
Elkins silty clay loam	461	.1
Ernest silt loam, 3 to 10 percent slopes	14,485	3.5
Ernest silt loam, 3 to 10 percent slopes, severely eroded	65	(1)
Ernest silt loam, 10 to 20 percent slopes	7,350	1.8
Ernest silt loam, 20 to 30 percent slopes	141	(1)
Ernest stony silt loam, 3 to 20 percent slopes	29,279	7.1
Ernest stony silt loam, 20 to 30 percent slopes	2,407	.6
Gilpin channery silt loam, 3 to 10 percent slopes	2,603	.6
Gilpin channery silt loam, 10 to 20 percent slopes	7,020	1.7
Gilpin channery silt loam, 10 to 20 percent slopes, severely eroded	234	.1
Gilpin channery silt loam, 20 to 30 percent slopes	7,377	1.8
Gilpin channery silt loam, 20 to 30 percent slopes, severely eroded	535	.1
Gilpin channery silt loam, 30 to 40 percent slopes	12,114	2.9
Gilpin channery silt loam, 30 to 40 percent slopes, severely eroded	630	.2

See footnote at end of table.

TABLE 4.—*Approximate acreage and proportionate extent of soils and miscellaneous land types*—Continued

Soil or miscellaneous land type	Acres	Percent
Gilpin channery silt loam, 40 to 65 percent slopes	16,026	3.9
Gilpin silt loam, 3 to 10 percent slopes	21,402	5.2
Gilpin silt loam, 3 to 10 percent slopes, severely eroded	658	.2
Gilpin silt loam, 10 to 20 percent slopes	24,842	6.0
Gilpin silt loam, 10 to 20 percent slopes, severely eroded	3,844	.9
Gilpin silt loam, 20 to 30 percent slopes	20,030	4.9
Gilpin silt loam, 20 to 30 percent slopes, severely eroded	3,703	.9
Gilpin silt loam, 30 to 40 percent slopes	13,600	3.3
Gilpin silt loam, 30 to 40 percent slopes, severely eroded	2,180	.5
Gilpin silt loam, 40 to 65 percent slopes	1,889	.5
Gilpin stony silt loam, 3 to 10 percent slopes	3,543	.8
Gilpin stony silt loam, 10 to 20 percent slopes	9,155	2.2
Gilpin stony silt loam, 20 to 30 percent slopes	16,760	4.1
Gilpin stony silt loam, 30 to 40 percent slopes	19,953	4.8
Gilpin stony silt loam, 40 to 65 percent slopes	8,214	2.0
Lickdale silty clay loam, 0 to 6 percent slopes	1,098	.3
Lickdale stony silty clay loam, 0 to 15 percent slopes	2,358	.6
Made land	66	(1)
Mine dumps	75	(1)
Melvin silt loam	865	.2
Mixed alluvial land	271	.1
Monongahela silt loam, 0 to 10 percent slopes	337	.1
Monongahela silt loam, 10 to 20 percent slopes	131	(1)
Philo silt loam	3,919	.9
Pope fine sandy loam, 0 to 6 percent slopes	864	.2
Pope gravelly silt loam	1,710	.4
Pope silt loam	508	.1
Rayne silt loam, 3 to 10 percent slopes	5,581	1.4
Rayne silt loam, 3 to 10 percent slopes, severely eroded	94	(1)
Rayne silt loam, 10 to 20 percent slopes	921	.2
Rayne silt loam, 10 to 20 percent slopes, severely eroded	235	.1
Sequatchie fine sandy loam, 0 to 3 percent slopes	442	.1
Shelocta silt loam, 3 to 10 percent slopes	74	(1)
Shelocta silt loam, 10 to 20 percent slopes	394	.1
Shelocta silt loam, 20 to 30 percent slopes	3,073	.7
Strip-mine spoil	1,974	.5
Tyler silt loam, 0 to 6 percent slopes	225	.1
Upshur silty clay loam, 3 to 10 percent slopes	112	(1)
Upshur silty clay loam, 10 to 20 percent slopes	234	.1
Upshur silty clay loam, 20 to 30 percent slopes	498	.1
Upshur silty clay loam, 20 to 30 percent slopes, severely eroded	206	(1)
Upshur silty clay loam, 30 to 40 percent slopes	366	.1
Upshur silty clay loam, 30 to 40 percent slopes, severely eroded	141	(1)
Wharton silt loam, 3 to 10 percent slopes	6,558	1.6
Wharton silt loam, 3 to 10 percent slopes, severely eroded	273	.1
Wharton silt loam, 10 to 20 percent slopes	6,344	1.5
Wharton silt loam, 10 to 20 percent slopes, severely eroded	423	.1
Wharton silt loam, 20 to 30 percent slopes	1,419	.3
Wharton silt loam, 20 to 30 percent slopes, severely eroded	234	.1
Subtotal	404,011	97.9
Miscellaneous areas, quarries, roads, etc	6,740	1.6
Water	2,049	.5
Total	412,800	100.0

[1] Less than 1/10 of 1 percent.

Atkins Series

The Atkins series consists of poorly drained soils on the bottom lands. They are in the glade areas and along streams where acid sandstone and shale materials have washed down from the adjacent upland. They are associated with the well drained Pope and the moderately well drained to somewhat poorly drained Philo soils. The Atkins soils have very weakly developed profiles.

Typical profile: (Atkins silt loam, 0 to 6 percent slopes).

A_p 0 to 9 inches, gray (10YR 5/1) silt loam, strong brown (7.5YR 5/6) mottles; massive structure.

C_g 9 to 24 inches, gray (2 5Y 5/0) heavy silt loam; dark brown (10YR 4/3) and yellowish-brown (10YR 5/8) mottles prominent, especially in root channels; massive structure

Range in characteristics: Atkins soils vary greatly in texture. The surface soil is mainly silt loam and silty clay loam, but in some small areas fine sandy loam is included with the silt loam. The subsoil generally ranges from silt loam to silty clay, but in some areas the subsoil is finer textured, with sandy layers interbedded. A sandy subsoil is most common in the silt loam soil type. The organic matter in the surface soil ranges from about 2 to 5 percent and, in places, approaches the amount in the darker colored Elkins soil.

Location: Bottom lands, stream heads, and glade areas.

Slope: Level or nearly level to gently sloping.

Drainage: Poor to very poor.

Subsoil permeability: Moderately slow to very slow.

Use and management: The Atkins soils are strongly acid; they require large amounts of lime to correct their acidity. Unless drained, they are usually covered with sedges and other plants that tolerate a wet habitat. Most Atkins soils are pastured; however, some artificial drainage usually is needed before they can be used for improved pasture or for hay or other crops. Most areas of these soils are subject to flooding, but the frequency of floods varies from once a year to once in every 4 or 5.

Atkins silt loam (Aa).—The profile of this soil is that described as typical of the Atkins series. Slopes range from 0 to 6 percent. This soil generally responds well to subsurface drainage. When drained, it can be used for pasture, hay, or other crops tolerant of wetness. Management group 18 (IIIw–1).

Atkins silty clay loam (Ab).—This soil has a finer texture than Atkins silt loam, both in the surface layer and subsoil. As a result, permeability is slower and drainage and management are more difficult. Its use, therefore, is usually limited to pasture, hay, or other crops tolerant of wetness. Slopes range from 0 to 6 percent. Management group 24 (IVw–1).

Belmont Series

The Belmont are deep, well-drained soils of the uplands. They developed on materials weathered mainly from interbedded calcareous red shale, sandstone, and limestone. The parent material contains a small amount of colluvium. These soils occur in bands where the Greenbrier limestone outcrops in the eastern part of the county.

Typical profile in a cultivated area (Belmont silt loam, 3 to 10 percent slopes):

A_p 0 to 6 inches, brown (7.5YR 5/2, dry) to dark-brown (7.5YR 4/2, moist) silt loam; moderate fine granular structure, abrupt boundary.

B_1 6 to 12 inches, reddish-brown (5YR 4/3) silty clay loam; moderate to strong medium and coarse subangular blocky structure, stained with material from A_p layer; gradual transition

B_2 12 to 18 inches, reddish-brown (2 5YR 4/3 on outside of aggregates; (2 5YR 4/4 on inside) silty clay loam, strongly defined medium and coarse subangular blocky structure

B_3 18 to 25 inches, reddish-brown (2 5YR 4/4) silty clay loam; moderately defined medium subangular blocky structure; 50 percent of mass is soft sandstone rocks, contains pockets of heavy clay, wavy boundary.

C_1 25 to 35 inches, reddish brown (2.5YR 4/4) fine sandy loam, 75 percent rotten sandstone (interior of stones is dark reddish brown, 5YR 3/3); structureless; horizon more firm than the C_2.

C_2 35 to 43 inches, reddish-brown (5YR 4/3) fine sandy loam to fine sandy clay loam, structureless, horizon is porous, thoroughly weathered siltstone that crushes readily, this layer was very moist when examined.

D 43 inches +, red shale or siltstone.

Range in characteristics: Belmont soils have a wide range in the proportions of sandstone, shale, and limestone fragments in their material. Subsoil textures range from silty clay loam to silt loam, and acidity varies according to the amount of limestone in the parent material.

Location: Lower part of steep hillsides immediately below a belt of Calvin soils, which, in turn, are below the Dekalb soils that cap the ridges.

Slope: Gently sloping to very steep (3 to 65 percent).

Drainage: Well drained.

Permeability: Moderate; soils hold moisture well.

Use and management: Most fertile upland soils in the county. If well managed, excellent for hay and pasture.

Belmont silt loam, 3 to 10 percent slopes (Ba).—This soil has the profile described as typical of the Belmont series. It is well suited to all crops commonly grown in the county. The steeper areas need erosion control. Management group 5 (IIe–11).

Belmont silt loam, 10 to 20 percent slopes (Bb).—Because this soil is steeper than Belmont silt loam, 3 to 10 percent slopes, it needs more careful management to control erosion. Management group 13 (IIIe–11).

Belmont silt loam, 20 to 30 percent slopes (Bc). -The parent material of this soil contains more colluvium than is in the less steep Belmont silt loams, and in many places the A and B horizons of this soil are thinner. This soil should be kept in hay or pasture most of the time. Management group 22 (IVe–11).

Belmont silt loam, 30 to 40 percent slopes (Bd).—This soil is similar to Belmont silt loam, 3 to 10 percent slopes, but its layers are thinner and there is more evidence of soil mixing because of erosion. It should therefore be kept in pasture or woods. Properly managed, it produces good bluegrass pasture and supports good tree growth. Management group 26 (VIe -3).

Belmont silt loam, 40 to 65 percent slopes (Be).—This soil has the general characteristics of the Belmont silt loam, 3 to 10 percent slopes, but the horizons are generally from 25 to 40 percent thinner. It contains more colluvial parent material, and, in most places, it contains more stone fragments. This soil produces good trees. The very steep slopes are impractical to manage for pasture. Management group 29 (VIIe–1).

Belmont stony silt loam, 10 to 20 percent slopes (Bf). -The profile of this soil is similar to that of Belmont silt loam, 3 to 10 percent slopes, but it is stony. The stones are so large and numerous it is impractical to use farm machinery. Some areas can be used for permanent pasture, but it is difficult to apply the lime and fertilizer needed to maintain a good sod. Management group 27 (VIs–1).

Belmont stony silt loam, 20 to 30 percent slopes (Bg).—Except for steeper slopes, this soil is similar to Belmont stony silt loam, 10 to 20 percent slopes. Some areas can be managed for pasture, but most of the soil is in woods. This is an excellent soil for trees. Management group 27 (VIs–1).

Belmont stony silt loam, 30 to 40 percent slopes (Bh).—This soil normally has thinner layers than other Belmont stony silt loams, and its material is more mixed. Because of the hazards of slope and stoniness, this soil is best used as woodland. Management group 29 (VIIe–1).

Brinkerton Series

The Brinkerton are deep somewhat poorly drained soils that have a gray surface soil. They developed on colluvial material weathered from acid gray shales and sandstone. They are located almost entirely in areas of Gilpin soils. The Brinkerton soils normally are on the gentle slopes between bottom-land and hilly areas. They receive seepage water from the hillsides on which the Gilpin and similar soils are located.

Typical profile (Brinkerton silt loam, 0 to 3 percent slopes):

A_1 0 to 2 inches, dark-gray (10YR 4/1) silt loam; weak fine granular structure; loose consistence.

A_2 2 to 8 inches, very dark gray-brown (10YR 3/2) silt loam, faintly mottled, moderately defined coarse subangular blocky structure; aggregates are arranged in weak prisms that break into weak thick platy and medium subangular blocky and blocky structure, friable consistence.

B_{21g} 8 to 16 inches, gray-brown (10YR 5/2) light silty clay loam mottled with strong brown (7 5YR 5/8); weakly defined very coarse prismatic structure, friable consistence, gradual boundary.

B_{22g} 16 to 40 inches, silty clay loam, dark gray (2.5Y 4/0) exterior of peds, gray (2 5Y 5/0) interior, 50 percent of surface covered by reddish-yellow (7 5YR 6/8) fine distinct mottles; massive structure breaking into large polygons 10 to 16 inches in diameter, firm to very firm consistence.

C 40 inches+, silty clay loam; slightly lighter texture than B_{22g}; color, mottling, and structure same as in B_{22g}; firm consistence.

Range in characteristics: Texture of the subsoil is dominantly silty clay loam, but the range is from heavy silt loam to clay; depth to mottling ranges from about 6 to 14 inches.

Location: Immediately above flood plains

Slope: Nearly level to moderately sloping.

Drainage: Somewhat poorly drained.

Permeability: Slow to very slow in lower subsoil.

Use and management: Brinkerton soils need some artificial drainage for effective use as cropland or as good pastureland. These soils are strongly acid: they require heavy applications of lime

Brinkerton silt loam, 0 to 3 percent slopes (Bk). –This soil has the profile described as typical of the Brinkerton series. If artificially drained and heavily limed, it will produce satisfactory crops or pasture. Management group 24 (IVw–1).

Brinkerton silt loam, 3 to 10 percent slopes (Bm).—The surface drainage of this soil is better than on the more level Brinkerton silt loam, 0 to 3 percent slopes. The soil requires artificial drainage and a heavy application of

lime if it is to produce good pasture or crops. Management group 24 (IVw–1).

Brinkerton stony silt loam, 0 to 15 percent slopes (Bn).—The profile of this soil is similar to those of the other Brinkerton silt loams, but it is stony. The stones are so large and numerous that they seriously interfere with the use of farm machinery. Because of the stones and wetness, this soil is best used as pasture and woodland. Management group 28 (VIs–2).

Calvin Series

The Calvin soils are shallow to moderately deep, well-drained upland soils developed from alternating layers of red acid shale, red siltstone, and red sandstone of the Catskill and Mauch Chunk geologic series. These soils occur mainly in the eastern part of the county.

Typical profile (Calvin silt loam, 3 to 10 percent slopes):

A_1	0 to 2 inches, very dark brown (10YR 2/2) silt loam, moderately defined medium granular structure; loose consistence; gradual boundary.
A_2	2 to 8 inches, dark reddish-brown (5YR 3/4) silt loam; weak fine subangular blocky structure, friable consistence; clear boundary
A_3	8 to 12 inches, dark reddish-brown (2.5YR 3/4) silt loam grading to light silty clay loam, weakly defined medium subangular blocky structure; friable consistence.
B_2	12 to 25 inches, reddish-brown (2.5YR 4/4) silty clay loam; moderately defined medium and coarse subangular blocky structure; firm consistence; gradual transition.
B_3	25 to 32 inches, dusky red (2.5YR 3/2) silty clay loam; moderately defined medium and coarse subangular blocky structure, 40 percent of material is medium and coarse siltstone and sandstone fragments that are dark reddish brown on the inside.
C_1 or D_1	32 inches+, 90 percent of material is partially weathered siltstone grading to unaltered siltstone and fine-grained sandstone; inside of this unaltered parent material is green or olive.

Range in characteristics: Depth to bedrock ranges from about 15 to 36 inches. From 10 to 20 percent of the soil mass is small, angular stone fragments. These fragments are scattered on the surface and throughout the profile. Small areas may be higher in stone content, but the stones do not interfere with normal use of the soil. In fact, the stone fragments help protect the soil from erosion. The texture of the B horizon is mostly a light silty clay loam, but in places it is a silt loam. Where these soils formed mainly from shale materials they are not so deep and are more easily eroded than where they developed mainly from sandstone.

Location: On uplands.

Slope: Gently sloping to very steep (3 to 65 percent); slopes are fairly smooth and uniform.

Drainage: Well drained; some seeps on hillsides.

Permeability: Moderate; soils are inclined to be droughty because they are shallow.

Use and management: Calvin soils are of average natural fertility, strongly acid, and somewhat droughty They are suitable for all crops commonly grown in the county.

Calvin silt loam, 3 to 10 percent slopes (Ca).—This soil has the profile described as typical of the Calvin series Slopes are gentle, and erosion is slight or moderate. This soil is suitable for fairly intensive use, but it needs stripcropping to prevent erosion, and other good soil management to maintain fertility and organic matter. Management group 4 (IIe–10).

Calvin silt loam, 10 to 20 percent slopes (Cb).—This soil is similar to Calvin silt loam, 3 to 10 percent slopes, but it is more strongly sloping and more easily eroded. Management group 12 (IIIe–10).

Calvin silt loam, 10 to 20 percent slopes, severely eroded (Cc).—The profile of this soil differs from that of Calvin silt loam, 3 to 10 percent slopes. Erosion has removed most of the surface soil. The present plow layer is a mixture of the remaining original surface soil and the heavier subsoil. This plow layer is lower in organic matter, has poorer tilth, and takes up water less readily than the plow layer of Calvin silt loam, 3 to 10 percent slopes. Because of erosion, this soil should not be used so intensively as Calvin silt loam, 3 to 10 percent slopes. Management group 20 (IVe–3).

Calvin silt loam, 20 to 30 percent slopes (Cd).—The profile of this soil is similar to that of Calvin silt loam, 3 to 10 percent slopes, but more mixing of shale and sandstone has occurred. This soil is on strong slopes; it is low in fertility and easily eroded It is best suited to permanent hay, pasture, or woods. Management group 20 (IVe–3).

Calvin silt loam, 20 to 30 percent slopes, severely eroded (Ce).—Erosion has removed most of the original surface soil. Otherwise the profile is similar to that described for the Calvin series. The present surface soil is low in organic matter, takes up water slowly, and is susceptible to further erosion. This soil therefore should be kept under permanent cover. Management group 20 (IVe–3).

Calvin silt loam, 30 to 40 percent slopes (Cf).—More mixing and a larger amount of shale and sandstone on the surface and throughout the profile make this soil different from Calvin silt loam, 3 to 10 percent slopes. It is useful only as pasture or woodland because of its steep slopes. Management group 25 (VIe–2).

Calvin silt loam, 30 to 40 percent slopes, severely eroded (Cg).—The profile of this soil is similar to that described for the Calvin series, but most of the original surface soil has been removed by erosion. Because this soil is steep and eroded, it is best used as woodland. Management group 30 (VIIe–2).

Calvin silt loam, 40 to 65 percent slopes (Ch).—There has been much mixing of the shale and sandstone on these steep slopes, so the profile is somewhat variable in texture. The B horizon is thinner than on the more gentle slopes. This soil is too steep and erodible for crops or pasture and is best used as woodland. Management group 30 (VIIe–2).

Calvin silt loam, 40 to 65 percent slopes, severely eroded (Ck).—This soil has lost most of its original surface soil. Because of steep slopes, erosion, shallowness, and low fertility, it is best used as woodland. Management group 31 (VIIe–3).

Cavode Series

In the Cavode series are deep, somewhat poorly drained claypan soils derived from gray clay shale and fire clay. They occur on flats, benches, and gentle slopes. These soils are similar to Wharton soils, but internal drainage is poorer because the claypan is nearer the surface. Since most of these soils lie adjacent to areas of Wharton soils

and must be managed with the Wharton soils, they are important even though their yields are low.

Typical profile (Cavode silt loam, 3 to 10 percent slopes):

A_p 0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weakly defined medium granular structure; friable when moist.

B_2 8 to 14 inches, yellowish-brown (10YR 5/6) silty clay loam, moderately defined medium subangular blocky structure; firm when moist; gradual transition.

B_{2g} 14 to 18 inches, yellowish-brown (10YR 5/6) silty clay loam, many mottles of strong brown (7.5YR 5/8), strongly defined medium blocky structure; plastic when wet.

B_{2g} 18 to 40 inches, yellowish-brown (10YR 5/8) clay; many mottles of strong brown (7.5YR 5/8) and brown (10YR 5/3), very hard when dry, strongly defined coarse blocky structure.

Range in characteristics: Depth to the mottled clay layer ranges from about 12 to 16 inches. In places shale bedrock is within 24 inches of the surface.

Location: Benches, flats, and broad ridgetops.

Slope: Slopes range mostly from 5 to 10 percent, although the complete range is from 3 to 20 percent.

Drainage: Somewhat poorly drained Surface drainage poor in many places; internal drainage rather poor because of the tight claypan.

Permeability: Slow to very slow in the claypan.

Use and management: Although these soils are closely associated with Wharton soils, management is more difficult. These are problem soils. They are strongly acid, subject to serious erosion, warm up slowly in the spring, and are easily puddled if worked when too wet.

Cavode silt loam, 3 to 10 percent slopes (Cm).—This is the soil described as typical of the Cavode series. Even though the slopes are gentle, serious erosion can occur unless the soil is properly managed. Management group 19 (IIIw 5)

Cavode silt loam, 3 to 10 percent slopes, severely eroded (Cn).—The profile of this soil was once similar to that described for the series. Erosion has removed most of the original surface soil, however, and the plow layer now is a mixture of remaining original surface soil and the heavy subsoil. The depth to the mottled subsoil is at least 6 inches less than it was before the original surface soil was eroded. As a result of erosion, this soil has less organic matter, poorer tilth, and more runoff and erosion than Cavode silt loam, 3 to 10 percent slopes. Management group 21 (IVe–9).

Cavode silt loam, 10 to 20 percent slopes (Co).—The profile of this soil is similar to that described for the Cavode series. Because of the steeper slope, the erosion hazard is greater. Some small areas have severe sheet and gully erosion and should be seeded to long-term hay or pasture. Management group 21 (IVe 9).

Clarksburg Series (reddish variant)

The Clarksburg soils, reddish variant, are deep, moderately well drained colluvial soils. Their parent material is from the same kinds of rocks as those under the residual soils of the Belmont and Calvin series. Normally they are in bands below areas of the Belmont and Calvin soils. The surface of these soils in many places is hummocky and cut up by ravines. Except for the red color, these soils are similar to the Clarksburg soils mapped in other areas, but in those areas the Clarksburg soils are on colluvium from the Brooke, Westmoreland, and Litz soils.

Typical profile (Clarksburg silt loam, reddish variant, 3 to 10 percent slopes):

A_1 0 to 3 inches, dark reddish-brown (5YR 3/2) silt loam, weak fine granular structure, loose consistence.

A_2 3 to 8 inches, dark reddish-brown (5YR 3/4) silt loam; weak fine granular structure with tendency to platy; friable when moist, gradual transition.

B_{21} 8 to 14 inches, reddish-brown (5YR 4/4) silty clay loam; moderately defined medium subangular blocky structure, friable consistence, diffuse boundary.

B_{22} 14 to 27 inches, reddish-brown (5YR 4/4) silty clay loam; moderately defined medium subangular blocky structure; firm consistence; gradual transition

B_{2g} 27 to 38 inches, reddish-brown (5YR 4/3) silty clay loam; 10 percent of surface mottled with gray (7.5YR 6/0) and light red (2.5YR 5/8), weak to moderate coarse subangular blocky structure, very firm consistence, stones increase in lower part of horizon and appear to be cemented, many dark brown concretions

D 38 inches+, hard sandstone and siltstone.

Range in characteristics: The depth to mottling ranges from about 18 to 28 inches. On the surface of some areas there are sandstone fragments. Sinkholes occur in a few places north of Aurora where limestone is within a few feet of the surface.

Location: Lower slopes below areas of Belmont and Calvin soils.

Slope: Gently sloping to moderately sloping (3 to 20 percent); slopes are fairly uniform except where cut by natural drainageways.

Drainage: Moderately well drained. Small seepy spots are common, and small areas of well-drained soils are included.

Permeability: Moderate to slow in lower subsoil.

Use and management: The subsoil of these soils may be a bit poorly aerated for deep-rooted legumes, but the overall fertility is good. These soils respond well to good management, are especially good for pasture, and are excellent as woodland.

Clarksburg silt loam, reddish variant, 3 to 10 percent slopes (Cp).—The profile of this soil is that described as typical of the Clarksburg series. Slopes are gentle, but the soil needs simple measures to control erosion, as well as the other management practices normally needed to maintain or improve structure and productivity. This soil is especially good for pasture and is excellent as woodland. Management group 8 (IIe–14).

Clarksburg silt loam, reddish variant, 10 to 20 percent slopes (Cr).—In management, this soil differs from Clarksburg silt loam, reddish variant, 3 to 10 percent slopes, in that more intensive practices are needed to control erosion. A few acres are severely eroded. Except for these eroded areas, the soil can be used about the same as Clarksburg silt loam, reddish variant, 3 to 10 percent slopes. Management group 16 (IIIe 14)

Clymer Series

The Clymer are deep, well-drained upland soils weathered from acid sandstone. They occur typically on smooth ridgetops where the Pocono or Pottsville sandstone outcrops. Clymer soils are associated with the more shallow and stony Dekalb, the moderately well drained Cookport, and the very poorly drained Lickdale soils. Clymer soils are important to the agriculture of the county; they are particularly suitable for growing potatoes.

Typical profile (Clymer loam, 0 to 3 percent slopes):

A_p 0 to 7 inches, very dark grayish-brown (10YR 3/2) loam; moderately defined medium granular structure, loose consistence, abrupt boundary.

A_2 7 to 9 inches, dark-brown (10YR 4/3) light silt loam; weakly defined medium subangular blocky structure tending toward platy, friable when moist; clear boundary.

B_{21} 9 to 19 inches, dark-brown (7.5YR 4/4) light silt loam; weakly defined medium and coarse subangular blocky structure, friable when moist; 5 to 10 percent of material is coarse sandstone fragments, gradual boundary.

B_{22} 19 to 35 inches, dark-brown (7.5YR 4/4) light silt loam grading to sandy loam, weakly defined medium and coarse subangular blocky structure; friable when moist; 5 to 10 percent of material is coarse sandstone fragments.

C 35 to 39 inches, yellowish-brown (10YR 5/4) sandy loam; 50 percent of material is hard sandstone fragments 3 to 12 inches in diameter.

D 39 inches +, hard, gray sandstone.

Range in characteristics: From 5 to 10 percent of the profile may be coarse sandstone fragments. The surface layer ranges from loam to sandy loam; the subsoil, from light silt loam to sandy loam.

Location: Broad, smooth ridgetops.

Slope: In most places, less than 10 percent, but the range is 0 to 20 percent.

Drainage: Well drained.

Permeability: Moderately rapid.

Use and management: These soils are slightly below average in inherent fertility and are strongly acid, but they warm up early in the spring, are easily worked, hold moisture well, and respond readily to good management. Organic matter is easily lost, so rotations are needed that will maintain and build up organic matter and improve structure. All but the most nearly level areas need protection from erosion.

Clymer loam, 0 to 3 percent slopes (Ct). This soil has the profile described as typical of the Clymer series. Since the soil is nearly level, it needs no special treatment to guard against erosion. This soil is especially good for producing potatoes. Management group 1 (I-4).

Clymer loam, 3 to 10 percent slopes (Cu).—The profile of this soil is similar to that described as typical of the Clymer series. This soil is in gently sloping areas where contour stripcropping is generally needed. Management group 3 (IIe–4).

Clymer loam, 10 to 20 percent slopes (Cv).—This soil can be used in about the same way as Clymer loam, 0 to 3 percent slopes, but, because its slopes are stronger, more intensive management is needed to control erosion. Management group 11 (IIIe–4).

Clymer gravelly loam, 3 to 10 percent slopes (Cs).—The texture of the original surface soil and entire profile is coarser than that of Clymer loam, 0 to 3 percent slopes. Also, 15 percent or more of the soil material may be fine and medium gravel. Most of this soil is in the vicinity of Cranesville. It includes areas of soil that are called "beanstone land" because of the many quartz pebbles that weathered from the Pocono conglomerate sandstone. The moisture supply is not quite so favorable in this soil as in the Clymer loams, but under similar management it may be used in the same way. Management group 3 (IIe-4).

Cookport Series

The Cookport are deep, moderately well drained upland soils that, in most places, have a weak fragipan at a depth of 22 to 26 inches. They are on flats and are associated with the Dekalb and Clymer soils. The Cookport soils are stony in most places and have remained as woodland.

Typical profile (Cookport silt loam, 3 to 10 percent slopes):

A_1 0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam, weakly defined medium and fine granular structure, very friable when moist; clear boundary.

A_2 3 to 12 inches, dark-brown (10YR 4/3) silt loam; weakly defined medium and fine granular structure; very friable when moist; clear boundary; upper 2 inches of horizon stained with organic matter from the A_1 layer.

B_2 12 to 25 inches, yellowish-brown (10YR 5/8) silt loam; weakly defined medium subangular blocky structure; friable consistence, wavy boundary.

B_3 25 to 48 inches, olive-yellow (2.5Y 6/8) sandy loam with common gray (2.5Y 6/0) mottles; weakly defined medium platy structure, firm to very firm consistence; this layer is a fragipan.

D_r 48 inches +, horizontally bedded sandstone

Range in characteristics: The depth to mottling ranges from 18 to 30 inches. The profile described as typical for the Cookport series is slightly deeper to mottling than the rest, which indicates it has better drainage. The fragipan layer varies from rather weak to very firm.

Location: Broad, flat ridgetops.

Slope: Nearly level to moderately sloping (3 to 20 percent)

Drainage: Moderately well drained.

Permeability: Slow in lower subsoil; the tight layer limits aeration and growth of roots.

Use and management: Slow permeability in the subsoil, strong acidity, and below-average natural fertility are the important problems.

Cookport silt loam, 3 to 10 percent slopes (Cx).—This soil has the profile described as typical of the series. It is best used as woodland or pasture. Management group 7 (IIe-13).

Cookport stony silt loam, 5 to 20 percent slopes (Cy).—The profile of this soil is similar to that given for the Cookport series, but it is stony on the surface and throughout. Stones cover from 5 to 25 percent of the surface and limit the use of this soil to woods or pasture. Management group 30 (VIIe–2).

Dekalb Series

The Dekalb are shallow to moderately deep, well-drained to excessively drained upland soils on acid sandstone. They occur in the roughest areas of the county—Laurel Ridge, Briery Mountains, the Cheat River gorge north of Albright, and Snaggy Mountain. Many narrow ledges of bedrock outcrop in the Dekalb areas. About 90 percent of the acreage is woodland. Dekalb soils are second only to the Gilpin in total acreage.

Typical profile (Dekalb loam, 10 to 20 percent slopes):

A_1 0 to 2 inches, very dark gray (10YR 3/1) loam, moderate fine granular structure, loose consistence, abrupt boundary.

A_2 2 to 7 inches, brown (10YR 5/3) loam, moderate fine granular and weak fine subangular blocky structure, friable when moist, 15 percent of material is coarse sandstone fragments; gradual transition.

B_1 7 to 13 inches, yellowish-brown (10YR 5/4) loam; weak fine and medium subangular blocky structure, friable when moist; 25 percent of material is coarse sandstone fragments; gradual transition.

B_2 13 to 30 inches, yellowish-brown (10YR 5/4) loam grading to sandy loam; faintly mottled with reddish yellow (7.5YR 6/6); moderately defined medium and fine subangular blocky structure; friable consistence; 40 percent of material is coarse sandstone fragments, which increase in lower part of layer; tops of stones are covered with silty material from layers above, but bottoms are clean.

C_1 30 to 44 inches, yellowish-brown (10YR 5/4) sandy loam; 80 percent of material is coarse, loose sandstone fragments.

D_r 44 inches +, hard sandstone.

The Dekalb channery sandy loams and stony sandy loams slightly differ from the loams and stony loams in texture and associated characteristics.

Typical profile (Dekalb channery sandy loams, 10 to 20 percent slopes):

A_1 0 to 3 inches, very dark-gray (10YR 3/1) sandy loam, moderate fine granular structure, loose consistence

A_2 3 to 8 inches, gray-brown sandy loam; weak fine granular structure; friable when moist; 25 percent of material is angular sandstone fragments.

B_1 8 to 13 inches, yellowish-brown (10YR 5/5) sandy loam or loam, weak fine and medium subangular blocky structure, friable when moist; 25 percent of material is sandstone fragments.

B_2 13 to 25 inches, brownish-yellow (10YR 6/6) sandy loam; weakly defined medium and fine subangular blocky structure; friable when moist; 25 percent of material is sandstone fragments.

C 25 to 36 inches, brownish-yellow (10YR 6/6) loamy sand; structureless; 75 percent of material is sandstone fragments.

D_r 36 inches+, hard, gray sandstone of the Pottsville formation.

Range in characteristics: The Dekalb soils are on gently sloping to very steep slopes, and they vary widely because of differences in land form. On steep slopes, much mixing of rock and soil material has occurred, and consequently a weaker profile has developed. On moderate slopes, however, horizons are readily identified. The depth to rock ranges from about 15 to 36 inches. The shallowest soils occur on sharp ridge crests and near the top of steep slopes. In places, as along Chestnut Ridge, some shale is included in the parent material, and here the texture of the surface soil and B layers may be a silt loam or, as small inclusions, a silty clay loam.

The Dekalb channery sandy loams and Dekalb stony sandy loams formed mainly on sandstone of the Pottsville series. The Dekalb loams and Dekalb stony loams formed mainly on sandstone of the Pocono series that, in places, contains some carbonates that are not apparent in the soil profile. They are slightly browner than the Dekalb sandy loams and, in places, are finer in texture and perhaps a little more productive. These differences are slight and do not justify mapping another soil series.

Location: On mountains and walls of gorges along streams.

Slope: Mostly moderate to very steep (3 to 65 percent)

Drainage: Well drained to excessively drained.

Permeability: Rapid.

Use and management: These soils are strongly acid, below average in natural fertility, and inclined to be droughty. About 15 percent of the acreage is suitable for row crops, hay, or pasture; the rest, because of steep slopes and stones, should be kept in woods.

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Dekalb loam, 3 to 10 percent slopes (Df).—The profile of this soil is similar to the profile given as typical of Dekalb loams. The soil is droughty and low in natural fertility. It can be used for any of the crops commonly grown in the county, but yields are below average Management group 6 (IIe–12).

Dekalb loam, 10 to 20 percent slopes (Dg).—This soil has the profile described as typical of the Dekalb loams. It is suitable for all the uses common in the county. About 10 percent has been severely eroded, however, and the fairly steep slopes mean that intensive management is needed to prevent erosion and to maintain productivity. Management group 14 (IIIe–12).

Dekalb loam, 10 to 20 percent slopes, severely eroded (Dh).—The profile of this soil is similar to that described as typical of the Dekalb loams, but most of the original topsoil has been removed by erosion. The present topsoil contains less organic matter than the original surface layer. Erosion has also caused this soil to be more shallow, more droughty, and less fertile than the less eroded soils on the same slope. This soil therefore cannot be used so intensively as Dekalb loam, 10 to 20 percent slopes. Management group 20 (IVe–3).

Dekalb loam, 20 to 30 percent slopes (Dk).—About 12 percent of this soil has been severely eroded. Because of the steep slopes, low fertility, and droughtiness, this soil is best suited to long-term hay, pasture, or woods. Management group 20 (IVe 3).

Dekalb loam, 20 to 30 percent slopes, severely eroded (Dm). Erosion has removed most of the original surface layer from this soil. Lack of organic matter, shallow depth, low natural fertility, and low content of moisture limit use of this soil. It is suitable only as woodland Management group 20 (IVe–3).

Dekalb loam, 30 to 40 percent slopes (Dn).—The profile of this soil has a slightly thinner B horizon than that described as typical of Dekalb loams, and all its layers are less distinct. More than 25 percent of the 400 acres of this soil is severely eroded. The soil is not very productive, even under the best management. To maintain the present soil material and organic matter on these steep slopes, it is best to use this soil as woodland. Management group 30 (VIIe–2).

Dekalb loam, 30 to 40 percent slopes, severely eroded (Do).—The profile of this soil is similar to that given as typical of the Dekalb loams, but it is more shallow and contains less organic matter. Because of steep slopes, low fertility, and susceptibility to further erosion, this soil is suitable only as woodland. Management group 31 (VIIe–3).

Dekalb stony loam, 5 to 20 percent slopes (Dp).—The profile of this soil differs from the profile given as typical of the Dekalb loams in being stony on the surface and throughout. Approximately 15 percent of the surface of this stony soil is covered with stone or almost paved with it. A few acres are severely eroded. Management group 30 (VIIe–2).

Dekalb stony loam, 20 to 30 percent slopes (Dr).—The profile of this soil is similar to that described as typical of the Dekalb loams, but large stones cover more than 20 percent of the area. Because of the stones, it is practical to use this soil only for trees. Management group 30 (VIIe–2).

Dekalb stony loam, 30 to 40 percent slopes (Ds).—This soil is similar to that described as typical of the Dekalb

loams, but it is stony and more shallow. Management is difficult because of steepness, ledges, and stoniness. The soil is best used for trees Management group 30 (VIIe - 2).

Dekalb stony loam, 40 to 65 percent slopes (Dt).—The profile of this soil is similar to that described as typical of Dekalb loams, but it is stony throughout and the layers are less distinct. In places the areas on lower slopes are fairly deep to bedrock, but the B horizon is faint and generally thin. Management group 30 (VIIe–2).

Dekalb channery sandy loam, 3 to 10 percent slopes (Da).—The profile of this soil is similar to that described as typical of the Dekalb channery sandy loams, but the B_2 layer grades abruptly into the bedrock, in places, with little or no C horizon. This soil is easily worked and takes up water rapidly, but it has low natural fertility and limited capacity for storing moisture. This soil is suitable for all crops commonly grown in the county, but it needs some protection from erosion and requires frequent applications of lime and fertilizer. Management group 6 (IIe - 12).

Dekalb channery sandy loam, 10 to 20 percent slopes (Db).—The profile of this soil is that described as representative of the Dekalb channery sandy loams. This soil is suitable for all crops commonly grown in the county, but it needs protection from erosion, and fertilizer and lime should be applied frequently to maintain productivity. A few acres are severely eroded. Management group 14 (IIIe-12).

Dekalb channery sandy loam, 20 to 30 percent slopes (Dc).—The profile of this soil is similar to the profile described as typical of the Dekalb channery sandy loams, but the slopes are so steep the soil cannot be managed as rotation cropland. It does not hold moisture well and is low in natural fertility. This soil is best used for hay, pasture, or trees. Management group 20 (IVe–3).

Dekalb channery sandy loam, 30 to 40 percent slopes (Dd).—The profile of this soil is similar to that described as typical of channery Dekalb soils, but it is slightly shallower and, in most places, contains more stone fragments. Because of the strong slopes, this soil is best used as pasture or woodland. Management group 30 (VIIe–2).

Dekalb channery sandy loam, 40 to 65 percent slopes (De).—The profile of this soil is similar to that described as typical of Dekalb channery sandy loams. The steeper slopes have caused more mixing of the soil materials, however, and in most places bedrock is nearer the surface. Also, stone fragments may make up 30 to 40 percent of the soil material throughout the profile. This soil is so steep it can be used effectively only as woodland. Management group 30 (VIIe–2).

Dekalb stony sandy loam, 5 to 20 percent slopes (Du) — The profile of this soil is similar to that described as typical of Dekalb channery sandy loams, but large stones cover from 10 to 50 percent of the surface and prevent any practical use other than as woodland. Management group 30 (VIIe–2).

Dekalb stony sandy loam, 20 to 30 percent slopes (Dv).—The profile of this soil is similar to that described as typical of Dekalb channery sandy loams, but large sandstone fragments cover from 10 to 50 percent of the surface. Almost all of this soil is wooded; stones interfere with any other use. Management group 30 (VIIe–2).

Dekalb stony sandy loam, 30 to 40 percent slopes (Dw) —The profile of this soil is similar to that described as typical of Dekalb channery sandy loams, but stones occur throughout, and the B horizon is generally thinner and less distinct. The stones prevent using this soil other than for trees. Management group 30 (VIIe 2).

Dekalb stony sandy loam, 40 to 65 percent slopes (Dx).—The profile of this soil is similar to the profile typical of Dekalb channery sandy loams. The soil is shallower to bedrock on all but the lower slopes, however, and there is considerable mixing of material in the profile because of colluvial action. Stones cover from 10 to 50 percent of the surface and prevent any effective use other than as woodland. Management group 30 (VIIe 2).

Elkins Series

The Elkins are dark-surfaced, very poorly drained, bottom-land soils subject to flooding. The surface soil is fairly high in organic matter, and its dark color frequently carries down 10 or 12 inches.

These soils occur mainly in the glade areas. They were derived from acid sandstone and shale of the uplands and are associated with and similar to the Atkins soils. The Elkins soils, however, have darker colored surface layers and contain more organic matter than the Atkins

Typical profile:

- A_1 0 to 8 inches, black (2.5Y 2/1) silt loam to silty clay loam; moderate fine granular structure, loose consistence, gradual boundary.
- C_g 8 to 24 inches, dark-gray (2.5Y 4/0) heavy silt loam with many, fine, prominent rusty-brown and dark-red (2.5YR 3/6) mottles and streaks, mottles are particularly prominent along root channels, massive structure, friable to firm consistence; clear boundary.
- D 24 inches+, dark-red colluvial material of silty clay loam texture derived from shale, this layer is an unconformity, that is, not a source of the soil material that overlies it.

Range in characteristics: In most places the subsoil ranges from silt loam to silty clay loam, but in some areas it is a fine sandy loam. Locally, the subsoil of silt loam or silty clay loam contains layers of fine sandy loam

Location: Bottom lands and depressions in the flood plains; swampy areas at the outer edge of the flood plains, away from the streams

Slope: Level up to 6 percent.

Drainage: Very poor; water table is at or near the surface most of the year unless soils are artificially drained.

Permeability: Slow in most places, but range is from moderately slow to very slow, depending on the texture of the subsoil.

Use and management: These soils are strongly acid and require large amounts of lime. They produce poor pasture and sedges unless they are drained. Most areas respond to tile drainage if the tiles are closely spaced. Tile is not effective in some spots that have a heavy clay subsoil. With drainage and frequent applications of lime and fertilizer, the soils can be made productive.

Elkins silty clay loam (Ea).—This soil, the only Elkins soil mapped in the county, needs tile drainage, lime, and fertilizer. It is the soil described as typical of the Elkins series. It is on slopes of 0 to 6 percent. Management group 18 (IIIw–1).

Ernest Series

The Ernest are deep, moderately well drained soils that formed in colluvial material derived from acid sandstone and shale. A fragipan or claypan, depending on the dominance of sandstone or shale, occurs at depths of 20

to 24 inches. Small stone fragments occur throughout the profile. These soils normally are on lower slopes of hillsides adjacent to the bottom lands along streams, around stream heads, and on the borders of terraces. They occur on almost every farm in the Gilpin and Dekalb soil areas of the county.

Typical profile (Ernest silt loam, 3 to 10 percent slopes):

A_p 0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam, weakly defined medium granular structure, very friable when moist.

B_{21} 8 to 16 inches, yellowish-brown (10YR 5/8) silty clay loam; moderately defined medium and fine subangular blocky structure; friable when moist, gradual boundary.

B_{22g} 16 to 23 inches, yellowish-brown (10YR 5/6) silty clay loam, 5 percent of surface material is mottled with grayish brown (10YR 5/2); moderately defined medium and fine subangular blocky structure; firm when moist; 20 to 30 percent of material is sandstone fragments, which increase slightly with depth.

B_{23gm} 23 to 60 inches+, gray (10YR 5/0) silty clay loam with many dark grayish-brown (10YR 4/2) mottles, massive, but tends toward coarse subangular blocky structure; very firm consistence; numerous iron and manganese concretions, this layer is a fragipan.

Range in characteristics: The tight subsoil layer ranges from a firm, brittle fragipan to a plastic claypan, according to the proportion of clay, shale, and sandstone in the parent material. A weak fragipan is dominant. Small seepy spots are common.

Location: In bands around the lower part of hillsides, as well as in fan-shaped areas along intermittent waterways. Tongues of these soils run up hillsides from the fans.

Slope: In most areas slopes range from 8 to 15 percent, but in some narrow bands they range up to 30 percent. In most places slopes are rather uniform, but they are commonly cut by steep-sided drainageways.

Drainage: Moderately well drained.

Permeability: Slow in pan zone; moderate in surface soil and upper subsoil.

Use and management: More than half of the total acreage of the Ernest soils is stony. On 3 to 15 percent of this acreage, stones are so large and numerous that they seriously restrict management for pasture and prevent cultivation. The nonstony soils of the Ernest series are important because they occur on almost every farm. They are strongly acid, have moderate amounts of the major plant nutrients, hold moisture well, and are good soils for pasture.

Ernest silt loam, 3 to 10 percent slopes (Eb). –This is the soil described as typical of the Ernest series. It needs good management and protection from erosion to be kept productive and in good tilth. Management group 7 (IIe–13).

Ernest silt loam, 3 to 10 percent slopes, severely eroded (Ec).—The profile of this soil is similar to that of Ernest silt loam, 3 to 10 percent slopes, except that most of the original surface soil has been removed by erosion. In comparison with the original surface soil, the present surface layer is lower in organic matter, poorer in tilth, heavier in texture, and less slowly permeable to water This soil should be used less intensively than Ernest silt loam, 3 to 10 percent slopes. Management group 15 (IIIe–13).

Ernest silt loam, 10 to 20 percent slopes (Ed).—This soil is similar to Ernest silt loam, 3 to 10 percent slopes, and can be used for about the same crops. It needs more protection from erosion because it is more strongly sloping. A few acres are severely eroded. Management group 15 (IIIe–13).

Ernest silt loam, 20 to 30 percent slopes (Ee).—Although this soil is similar to the Ernest silt loam, 3 to 10 percent slopes, it cannot be used so intensively. It is steep and is best suited to hay or pasture. Management group 21 (IVe-9).

Ernest stony silt loam, 3 to 20 percent slopes (Ef).—This soil differs from the Ernest silt loam, 3 to 10 percent slopes, in that it is moderately sloping and too stony to be used as cropland. Large stones are on from 3 to 15 percent of the surface. This is a very good soil for woodland. Management group 28 (VIs-2).

Ernest stony silt loam, 20 to 30 percent slopes (Eg).—The profile of this soil is similar to that of Ernest silt loam, 3 to 10 percent slopes. This soil, however, is stony and steeper. It is best to use this soil as pasture or woodland. It is very good as woodland. Management group 28 (VIs–2).

Gilpin Series

The Gilpin are moderately deep, well-drained soils developed on interbedded acid gray sandstone, siltstone, and shale. They are the most extensive and most important soils in the county. They occur throughout the county but are especially extensive in the southeastern, north-central, and southwestern parts. The Gilpin channery silt loams occur as broad areas in the southeast and extend northward as tongue-shaped areas to near Cranesville. These channery silt loams formed on parent material weathered from rocks of the Chemung geologic series. The Gilpin silt loams occur over the rest of the county and have developed on material derived from rocks of the Monongahela, Conemaugh, and Allegheny geologic series.

Typical profile (Gilpin silt loam, 10 to 20 percent slopes):

A_1 0 to 2 inches, dark-brown (10YR 3/3) silt loam; fine granular structure, loose when moist.

A_2 2 to 8 inches, yellowish-brown (10YR 5/4) silt loam, fine to medium granular structure, friable when moist.

B_2 8 to 18 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm to very firm; number of stone fragments increases in lower part of layer.

C_1 18 to 25 inches, mixed reddish-yellow (5YR 6/6) and pale-yellow (2.5Y 7/4) silty clay loam; coarse blocky structure; very hard when dry.

D 25 inches+, reddish-yellow (5YR 6/6) and pale-yellow (2.5Y 7/4) shale; interior color strong brown; 50 to 75 percent of material in this horizon is partially weathered shale.

Range in characteristics: Gilpin soils occur on a wide variety of slopes and in many different positions. The depth to rock varies from about 15 to 36 inches, and small areas of deeper soils are included. The shallowest areas occur at the upper edges of steep slopes and on narrow ridgetops. In places where the parent material included considerable sandstone, the surface soil is a loam and the subsoil is a silt loam. The Gilpin soils include areas of Wharton soils too small to map or manage separately.

Location: On rounded hills and steep hillsides.

Slope: Mostly 10 to 50 percent, but full range is from 3 to 65 percent. More than 85 percent of the total acreage of these soils is on slopes greater than 10 percent. On long hillsides the upper slopes are generally convex,

and the lower slopes, where the hillside merges with colluvial areas, are normally concave.

Drainage: Well drained.

Permeability: Moderate.

Use and management: The Gilpin soils are the most important to agriculture in Preston County. They are of average natural fertility, strongly acid, easy to work, and fair to good in their capacity to hold moisture. About half of the Gilpin acreage is suitable for row crops, grain, hay, or pasture. Stones and strong slopes limit the use of the rest to woodland. On more than 85 percent of the acreage, intensive management is needed to control erosion.

Gilpin silt loam, 3 to 10 percent slopes (Gk).—The profile of this soil is like that described for the Gilpin series. The soil is suitable for all crops commonly grown in the county if fertility is maintained and erosion is controlled. Included with this soil are small areas having slopes of 0 to 3 percent. These are managed like the rest of the soil because they are too small to allow separate management. Management group 4 (IIe–10).

Gilpin silt loam, 3 to 10 percent slopes, severely eroded (Gm).—The profile of this soil is similar to that described as typical of the Gilpin series, but most of the original surface soil has been removed by erosion. Plowing has mixed part of the silty clay loam subsoil with the remaining original surface soil. The texture of this plow layer is somewhat finer than that of the original surface layer, and the content of organic matter is lower. As a result, tilth is poorer, moisture is absorbed less readily, and runoff is greater.

This soil is suitable for about the same uses as Gilpin silt loam, 3 to 10 percent slopes, but more intensive management is needed to increase organic matter and to control runoff. Management group 12 (IIIe–10).

Gilpin silt loam, 10 to 20 percent slopes (Gn).—The profile of this soil is that described as typical of the Gilpin series. It is suitable for all general farm crops, but, because of the slope, it needs management that will maintain productivity and protect it from erosion. Management group 12 (IIIe 10).

Gilpin silt loam, 10 to 20 percent slopes, severely eroded (Go).—The profile of this soil is similar to that described as typical of the Gilpin series However, most of the original surface soil has been removed by erosion. The plow layer contains less organic matter than the original surface soil, is finer in texture, absorbs moisture less readily, and has poorer tilth This soil is suitable for about the same uses as Gilpin silt loam, 10 to 20 percent slopes, but it needs intensive management to increase organic matter and to control runoff. Management group 20 (IVe–3).

Gilpin silt loam, 20 to 30 percent slopes (Gp).—The profile of this soil is similar to that given as typical of the Gilpin series. Because of the slope and hazards of erosion, this soil needs to be kept in permanent vegetation. Management group 20 (IVe–3)

Gilpin silt loam, 20 to 30 percent slopes, severely eroded (Gr).—Erosion has removed most of the original surface layer, but otherwise the profile of this soil is similar to that described for the Gilpin series. The present surface soil is a mixture of the silty clay loam subsoil and the remaining original surface soil. The supply of organic matter is low, and tilth is poorer than the tilth of uneroded Gilpin silt loam on slopes of 10 to 20 percent. As a result, moisture is absorbed less readily and more soil is lost through runoff. To prevent further damage from erosion, the use of this soil should be limited to permanent hay or pasture in most areas. Management group 20 (IVe–3).

Gilpin silt loam, 30 to 40 percent slopes (Gs). The profile of this soil is similar to that described as typical of the Gilpin series, but somewhat more shallow to bedrock because of stronger slopes. For the same reason, more weathered material from shale and sandstone has been mixed with the profile of this soil than with the profile of less sloping Gilpin soils. Management group 25 (VIe–2).

Gilpin silt loam, 30 to 40 percent slopes, severely eroded (Gt).—This soil is similar to that described as typical of the Gilpin series, but it is more shallow, and most of the original surface soil has been removed by erosion. Because of erosion and slope, this soil is best used as woodland. Management group 31 (VIIe -3).

Gilpin silt loam, 40 to 65 percent slopes (Gu) —This soil differs from the Gilpin silt loam, 10 to 20 percent slopes. It is more shallow to bedrock and contains more material weathered from the interbedded shales and sandstone. A few acres are severely eroded. Management group 30 (VIIe–2).

Gilpin channery silt loam, 3 to 10 percent slopes (Ga).—The profile of this soil is similar to that described for the Gilpin series, but about 20 percent of the material is composed of thin, flat stone fragments less than 6 inches long. These small stones are no serious obstacle to the cultivation of crops commonly grown, but they might present some difficulties if crops requiring more intensive management were introduced.

This soil occurs in small flats, but to maintain fertility and to control erosion it should be managed in the same way as the soils on the surrounding slopes. Management group 4 (IIe–10).

Gilpin channery silt loam, 10 to 20 percent slopes (Gb).—The profile of this soil is similar to that described for the Gilpin series, but about 20 percent of it is made up of thin, flat stone fragments up to 6 inches in length. All crops commonly grown in the county will grow in this soil, but, because of the slope, this soil needs management that will protect it from erosion and maintain productivity. Management group 12 (IIIe–10).

Gilpin channery silt loam, 10 to 20 percent slopes, severely eroded (Gc).—About 20 percent of this soil is composed of thin, flat stone fragments less than 6 inches long; otherwise its profile is like that described for the Gilpin series. Most of the original surface soil has been removed by erosion, and the plow layer contains less organic matter, is heavier in texture, absorbs moisture less readily, and has poorer tilth than the original surface layer. This soil is suitable for about the same uses as Gilpin channery silt loam, 10 to 20 percent slopes, but it needs intensive management to increase organic matter and to control runoff. Management group 20 (IVe–3).

Gilpin channery silt loam, 20 to 30 percent slopes (Gd).—The profile of this soil is similar to that described as typical of the Gilpin series. On the average, 20 percent of the soil mass is composed of thin, flat stone fragments less than 6 inches long. Because of the slope and hazards of erosion, this soil should be kept in permanent vegetation. Management group 20 (IVe–3).

Gilpin channery silt loam, 20 to 30 percent slopes, severely eroded (Ge).—About 20 percent of this soil is

composed of thin, flat stone fragments less than 6 inches long. It has lost most of the original surface soil through erosion. The present topsoil is a mixture of the silty clay loam subsoil and the remaining original surface soil. The supply of organic matter is low, and tilth is poorer than in Gilpin channery silt loam, 20 to 30 percent slopes. As a result, moisture is absorbed less readily, and more soil is lost through runoff. Most of this soil needs to be used no more intensively than for permanent hay or pasture. Management group 20 (IVe–3).

Gilpin channery silt loam, 30 to 40 percent slopes (Gf).—The profile of this soil is similar to that described for the Gilpin series, but about 20 percent of the material is thin, flat stone fragments less than 6 inches long. It is shallow to bedrock because of slope and is suitable only for pasture or timber. Because the slopes are steep, more material weathered from sandstone and shale has been mixed into the profile of this soil than into the less strongly sloping Gilpin channery silt loams. Management group 25 (VIe–2).

Gilpin channery silt loam, 30 to 40 percent slopes, severely eroded (Gg).—On the average, about 20 percent of this soil is made up of thin, flat stone fragments less than 6 inches long. The profile is similar to that described as typical of the Gilpin series, but the soil is more shallow and more eroded. Erosion has removed most of the original surface soil. Because of erosion and steep slope, this soil is best used as woodland. Management group 31 (VIIe–3).

Gilpin channery silt loam, 40 to 65 percent slopes (Gh).—The profile of this soil is similar to that described for the Gilpin series, but about 20 percent of the soil material consists of thin, flat stone fragments less than 6 inches long. Also, more material weathered from interbedded shale and sandstone has been mixed into the profile. Included with this soil are a few severely eroded areas. This soil is best used as woodland. Management group 30 (VIIe–2).

Gilpin stony silt loam, 3 to 10 percent slopes (Gv).—The profile of this soil is similar to that described for the Gilpin series, but this soil is too stony for crops and, in most places, too stony for pasture. Included with this soil are a few acres on slopes of 0 to 3 percent. Management group 30 (VIIe–2).

Gilpin stony silt loam, 10 to 20 percent slopes (Gw).—The profile of this soil is similar to the profile described for the Gilpin series. The use of this soil is limited to trees or pasture because it is stony. A few acres are severely eroded. Management group 30 (VIIe–2).

Gilpin stony silt loam, 20 to 30 percent slopes (Gx).—The profile of this soil is similar to that given for the Gilpin series. This soil is best used for trees because it is stony and strongly sloping. A few acres are severely eroded. Management group 30 (VIIe–2).

Gilpin stony silt loam, 30 to 40 percent slopes (Gy).—The profile of this soil is similar to the profile described as typical of the Gilpin series, but it is more shallow and stony. This soil is too stony and steep to be used for crops or pasture. A few acres are severely eroded. Management group 30 (VIIe–2).

Gilpin stony silt loam, 40 to 65 percent slopes (Gz).—The profile of this soil is similar to that described for the Gilpin series, but this soil is too stony and steep to be used for crops or pasture. A few acres are severely eroded. Management group 30 (VIIe–2).

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Lickdale Series

The Lickdale are deep, very poorly drained soils that have a dark surface layer. They have formed in colluvial material derived from acid sandstone and shale They occur in association with upland soils. They are on the lower parts of slopes, around stream heads, and, to some extent, in small, depressed, wet areas among the upland soils. More than half of their acreage is stony.

Typical profile (Lickdale silty clay loam, 0 to 6 percent slopes):

- A_1 0 to 3 inches, black (10YR 2/1) silt loam to silty clay loam, moderately defined medium granular structure, loose consistence; abrupt boundary.
- A_{2g} 3 to 12 inches, dark-gray (10YR 4/1) silt loam; weak fine subangular blocky structure; root channels mottled with dark yellowish brown (10YR 4/4).
- C_g 12 to 40 inches+, gray (10YR 5/0) silty clay loam prominently mottled with yellowish brown (10YR 5/8); massive; slightly plastic consistence.

Range in characteristics: Where the parent material is mostly sandstone, the texture of the subsoil is silt loam or light silty clay loam.

Location: Around streamheads, in bands around flood plains, and in glades.

Slope: Nearly level to moderately sloping (0 to 15 percent).

Drainage: Very poorly drained; water table is at or near the surface most of the year.

Permeability: Variable but, in most areas, slow to very slow.

Use and management: Lickdale soils produce only swamp-type plants unless they are artificially drained. They are strongly acid.

Lickdale silty clay loam, 0 to 6 percent slopes (La).—This is the soil described as typical of the Lickdale series. It needs artificial drainage to produce the crops commonly grown in the county. Management group 24 (IVw–1).

Lickdale stony silty clay loam, 0 to 15 percent slopes (Lb).—The profile of this soil is similar to that described as typical for the Lickdale series. It is wet, and from about 3 to 25 percent of the surface is covered with stones. It is therefore suitable only for pasture or timber. Management group 28 (VIs–2).

Made Land

Made land (Ma) consists of miscellaneous areas that have been excavated or graded so that the original soil features have been destroyed. Approximately 66 acres of Made land was mapped in Preston County.

Mine Dumps

Mine dumps (Mb) are accumulations of waste rock, coal, and slate around sites where mining is done. Some of these dumps have burned. A mine dump is normally incapable of producing any worthwhile vegetation. Approximately 75 acres of such land occurs in Preston County.

Melvin Series

The Melvin are deep, poorly drained, lime-influenced, bottom-land soils. The parent material, derived in part from limestone, consists of sediments washed from uplands. About 800 acres of these soils occur along small streams in the limestone sections of the county. These soils are in narrow strips, often discontinuous, that generally occupy the entire flood plain. One soil of this series is mapped in the county.

Typical profile (Melvin silt loam, 0 to 6 percent slopes):

A_1 0 to 6 inches, dark-gray (2.5Y 4/0) silt loam, weakly defined granular structure; root channels are mottled with reddish brown (5YR 4/4).

C_g 6 to 36 inches, dark-gray (2.5Y 4/0) loam to fine sandy loam; massive; friable consistence.

Range in characteristics: The variable quantities of sandstone and shale in the parent material cause a considerable range in texture. The surface soil ranges from a silt loam to fine sandy loam, and the subsoil, from a sandy loam to silty clay loam.

Location: Narrow, irregular bottom lands.

Slope: Level to gently sloping (0 to 6 percent; dominantly less than 3 percent).

Drainage: Poorly drained; subject to frequent flooding.

Permeability: Moderate to slow.

Use and management: Best used for pasture along with soils of the adjacent uplands.

Melvin silt loam (Mc).—This soil has the profile described as typical of the Melvin series. Because it is so wet and is often flooded, it is best used for pasture or trees. Some drained areas are suitable for row crops or hay. Management group 18 (IIIw–1).

Mixed Alluvial Land

Mixed alluvial land (Md) is forming in recent sediments derived from adjacent uplands and, to some extent, from bottom-land soils that have been affected by mine wash. Small areas occur on the bottom lands along some of the small streams, and they vary in drainage, texture, and content of gravel. There are approximately 270 acres of this land in the county. Wetness, flooding, stoniness, or strong acidity prevents the use of much of the acreage for crops. Small, well-drained areas may be made suitable for cultivated crops, but it is more practical to use this land for pasture or timber. Management group 24 (IVw–1).

Monongahela Series

The Monongahela are moderately well drained soils on terraces that are above the level of present overflow of streams. They occur mainly along Big Sandy Creek above Bruceton Mills and along Route 92 south of Route 50. In the lower subsoil is a brittle, platy layer known as a fragipan. The parent material is composed of sediments from acid sandstone and shale. The soils normally have a few rounded pebbles throughout the profile.

Typical profile (Monongahela silt loam, 0 to 10 percent slopes).

A_p 0 to 8 inches, dark brown (10YR 3/3) silt loam, weak fine granular structure tending toward platy in lower part, loose when moist.

B_{21} 8 to 15 inches, brownish-yellow (10YR 6/8) silt loam; weak fine subangular blocky structure; friable to firm consistence, gradual boundary.

B_{22} 15 to 23 inches, yellow (10YR 7/6) silt loam; weakly defined medium subangular blocky structure; friable to firm consistence; gradual boundary.

B_{2xgm} 23 to 40 inches, yellow (10YR 7/6) silt loam fragipan; 50 percent of surface mottled with gray (10YR 6/1) and dark-brown (7.5YR 4/4); coarse platy structure that breaks to weak and medium subangular blocky; very firm when moist, hard when dry, and slightly plastic when wet.

D 40 inches +, hard, acid, gray sandstone.

Range in characteristics: Depth to the fragipan ranges from about 18 inches to 30 inches.

Location: Terrace benches above the level of the flood plains.

Slope: Nearly level to moderately sloping (0 to 20 percent).

Drainage: Moderately well drained.

Permeability: Slow in fragipan.

Use and management: These soils are suitable for the crops commonly grown in the county. The fragipan limits root penetration, so alfalfa and other deep-rooted crops may be injured by winter heaving. These soils are low in phosphorus and particularly low in potassium. They dry rather slowly in spring because the fragipan seriously slows downward movement of water. In wet seasons there is a perched water table above the fragipan.

Monongahela silt loam, 0 to 10 percent slopes (Me).—This is the soil described as typical for the Monongahela series. Management group 7 (IIe–13).

Monongahela silt loam, 10 to 20 percent slopes (Mf).—The profile of this soil is similar to that given as typical of the series. The soil needs more protection from erosion than Monongahela silt loam, 0 to 10 percent slopes. A few acres of this soil are severely eroded. Management group 15 (IIIe–13).

Philo Series

The Philo are deep, moderately well drained to somewhat poorly drained bottom-land soils These are the intermediately drained members of a group of alluvial soils that includes the well-drained Pope soils and the poorly drained Atkins and Elkins soils.

Philo soils are important to the agriculture of the county because they are productive and occur on most farms that have any bottom land. These soils were derived from acid, recently deposited sediments and have very weakly expressed profiles. One soil of the Philo series is mapped in the county.

Typical profile (Philo silt loam):

A_p 0 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; weakly defined medium granular structure; very friable when moist

C_1 9 to 15 inches, yellowish-brown (10YR 5/6) light loam; structureless, very friable when moist.

C_{2g} 15 to 40 inches, dark yellowish-brown (10YR 4/4) loam to fine sandy loam; 10 to 20 percent of surface covered with dark-brown (7.5YR 4/2) and gray (10YR 5/1) mottles; structureless; friable when moist, contains a few thin lenses of fine sand and of heavy silt loam to silty clay loam.

Range in characteristics: Internal drainage varies widely within short distances. Frequency of overflow varies from once a year to once every 10 or 12 years.

Location: Bottom lands in flood-plain areas.

Slope: Nearly level.

Drainage: Moderately well drained to somewhat poorly drained Water table is likely to be high in spring. If the water table is high, the soils warm up slowly.

Permeability: Moderate to slow.

Use and management: Flood hazards and restricted drainage are the main problems. They limit the use of some low areas to pasture. These are good soils for pasture Their natural fertility and capacity to hold moisture are good. The soils are suitable for most crops, but alfalfa may not do well, because for much of the year the soils are poorly aerated below 15 to 18 inches.

Philo silt loam (Pa).—This soil has the profile described as typical of the Philo series. If artificial drainage is

applied to take care of the wetness during winter and early in spring, this soil can be used for most crops commonly grown in the county. Management group 9 (IIw–7).

Pope Series

The Pope are deep, well-drained, bottom-land soils derived from recently deposited alluvium that weathered from acid sandstone and shale of the uplands. They are the well-drained soils of the group of alluvial soils that includes moderately well drained Philo soils and poorly drained Atkins and Elkins soils. The Pope soils are naturally fertile. Their largest area is along the Cheat River; small areas occur along most of the streams in association with the Gilpin and Dekalb soils.

Typical profile (Pope fine sandy loam, 0 to 6 percent slopes):

A_p 0 to 9 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; structureless, friable consistence.
C 9 to 40 inches, dark-brown (7.5YR 4/4) fine sandy loam; structureless, friable consistence.

Range of characteristics: The surface soil ranges from silt loam to fine sandy loam, and subsoil varies from silt loam to sandy loam. Some areas are overflowed almost every year; others are flooded only once every 10 or 12 years The Pope soils include some narrow strips of wet soils, Philo or Atkins, too small to be separated. These small areas are generally at the base of an adjacent hill, along the outer edge of the flood plain.

Location: Bottom land.

Slope: Level to 6 percent, but mostly less than 3 percent.

Drainage: Well-drained.

Permeability: Moderate to rapid. Air and water move rapidly in the sandy loam areas.

Use and management: These soils have high natural fertility, although the sandy loam soil has slightly less than the silt loam. The hazard of flooding must be judged locally, for it is not a uniform, mappable characteristic

Pope fine sandy loam, 0 to 6 percent slopes (Pb).—This is the soil described as typical of the Pope series. It is suitable for all crops commonly grown in the county and is especially good for truck crops. The soil warms up early in spring but is inclined to be a bit droughty. Management group 10 (IIs–2).

Pope gravelly silt loam (Pc).—This soil is gravelly throughout; the surface soil is a gravelly silt loam. Otherwise the soil profile is similar to that described as typical of the Pope series. The gravel does not interfere with cultivation or cause the soil to be droughty. All of this soil except the extremely gravelly areas can be used intensively. It is on slopes of 0 to 6 percent. Management group 2 (I–6)

Pope silt loam (Pd).—The surface soil is a silt loam, and the subsoil is generally a silt loam; otherwise the soil profile is similar to that given as typical of the Pope series. This soil can be used like Pope fine sandy loam, 0 to 6 percent slopes, but it is not so droughty. It is on slopes of 0 to 6 percent. Management group 2 (I–6).

Rayne Series

The Rayne are deep, well-drained upland soils that developed from gray acid sandstone and shale. They are on broad ridgetops and are associated with the Gilpin soils, which are generally on the hillsides They grade to the Wharton soils in areas where clay shale makes up a large part of the bedrock. The Rayne soils are important to the agriculture of the county because they are gently sloping and well suited to the crops commonly grown.

Typical profile (Rayne silt loam, 3 to 10 percent slopes):

A_p 0 to 8 inches, dark grayish-brown (10YR 3/2) silt loam; moderately defined medium granular structure, very friable.
A_2 8 to 12 inches, yellowish-brown (10YR 4/4) silt loam; weakly defined medium to coarse subangular blocky structure, friable.
B_{21} 12 to 27 inches, yellowish-brown (10YR 5/6) silty clay loam; moderately defined medium to coarse subangular blocky structure, firm consistence, gradual boundary.
B_{22} 27 to 35 inches, yellowish-brown (10YR 5/8) silty clay loam; moderately defined medium and coarse subangular blocky structure; firm consistence; a few coatings of iron and manganese in lower part of layer.
C_1 35 inches+, partially weathered gray sandstone and shale grading to hard parent rock.

Range in characteristics: The texture of the subsoil ranges from light silt loam to silty clay loam, but light silty clay loam is dominant. The depth to rock ranges from 30 to 48 inches. The soils include small areas that have a claypan immediately above the bedrock.

Location: Broad ridgetops.

Slope: Gently sloping to moderately sloping (3 to 20 percent); most slopes are from 5 to 10 percent.

Drainage: Well drained.

Permeability: Moderate; good capacity for holding moisture.

Use and management: Management practices are very similar to those for Gilpin soils, with which the Rayne soils are closely associated. The Rayne soils are deeper, so their capacity for holding moisture is greater. The Rayne soils are easy to work, average in fertility, and are very suitable for crops commonly grown in the county. Erosion can be serious unless good rotations and other desirable management practices are used.

Rayne silt loam, 3 to 10 percent slopes (Ra).—This is the soil described as typical of the Rayne series. Simple practices are needed to control erosion. Management group 3 (IIe–4).

Rayne silt loam, 3 to 10 percent slopes, severely eroded (Rb).—The profile of this soil is similar to that described for the Rayne series, except that most of the original surface soil has been removed by erosion. Plowing has mixed part of the silty clay loam subsoil with the remaining original surface soil. This plow layer is somewhat finer in texture and lower in its supply of organic matter than the plow layer of Rayne silt loam, 3 to 10 percent slopes. As a result, tilth is poorer, moisture is absorbed less readily, and more soil may be lost through runoff. This eroded soil is suited to about the same uses as Rayne silt loam, 3 to 10 percent slopes, but more intensive practices are needed to increase the supply of organic matter and to control runoff. Management group 11 (IIIe–4).

Rayne silt loam, 10 to 20 percent slopes (Rc).—The profile of this soil is similar to that described as typical of the Rayne series. Because of the slope, this soil should not be used so intensively as Rayne silt loam, 3 to 10 percent slopes. Management group 11 (IIIe–4).

Rayne silt loam, 10 to 20 percent slopes, severely eroded (Rd).—The profile of this soil is similar to that described for the Rayne series, but most of the original

surface soil has been removed by erosion. Plowing has mixed the remaining original surface soil with part of the heavier subsoil. This plow layer is lower in its supply of organic matter than the original surface soil and somewhat finer in texture. As a result, tilth is poorer, moisture is absorbed less readily, and more soil may be lost through runoff. Because of slope and hazard of erosion, this soil should be kept in close-growing crops most of the time. This soil can be improved to the point where it will produce good pasture and hay. Management group 20 (IVe–3).

Sequatchie Series

The Sequatchie are deep, well-drained soils that, in this county, occur almost entirely on second bottoms, or low terraces, along the Cheat River. They were derived from sediment weathered from acid sandstone and shale. These soils are very similar to the Pope soils, but they are flooded much less frequently than those on the first bottoms and are beginning to show some profile development. One soil of this series is mapped in the county.

Typical profile (Sequatchie fine sandy loam, 0 to 3 percent slopes):

A_p 0 to 9 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; structureless.

C 9 to 40 inches, dark-brown (7.5YR 4/4) loam to fine sandy loam; structureless but firmer than soils on first bottoms.

Range in characteristics: The texture of the subsoil ranges from loam to fine sandy loam. The permeability of the Sequatchie soils ranges from moderate to rapid.

Location: Low benches along flood plains; slightly higher than first bottoms.

Slope: Nearly level (0 to 3 percent).

Drainage: Well drained; areas with a sandy surface soil may be somewhat droughty.

Permeability: Moderate to rapid.

Use and management: Excellent for all uses; no special problems or hazards.

Sequatchie fine sandy loam, 0 to 3 percent slopes (Sa).—This is the soil described as typical of the Sequatchie series. It can be used for all the crops ordinarily grown in the county. Management group 10 (IIs–2).

Shelocta Series

The Shelocta are deep, well-drained soils on colluvium derived from acid sandstone and shale. They normally occupy the lower slopes between the upland and bottom land, and they are associated with the moderately well drained Ernest and somewhat poorly drained Brinkerton soils. The Shelocta soils are not important to the agriculture of the county, since they occur in the rough, wooded areas with Dekalb soils and have not been cleared.

Typical profile (Shelocta silt loam, 3 to 10 percent slopes):

A_1 0 to 2 inches, very dark gray (10YR 3/1) silt loam; moderately defined medium granular structure; loose consistence; clear boundary.

A_2 2 to 9 inches, dark-brown (10YR 4/3) silt loam; moderately defined medium granular structure; friable consistence; gradual boundary.

B_1 9 to 15 inches, yellowish-brown (10YR 5/4) silt loam grading to sandy loam; weak fine subangular blocky structure; friable consistence.

B_{21} 15 to 40 inches, yellowish-brown (10YR 5/8) sandy loam; weak subangular blocky structure; firm consistence.

B_{22m} 40 to 96 inches+, yellowish-brown (10YR 5/6) sandy loam with prominent gray mottles; massive structure, very firm consistence; abundant black and brown concretions; layer is a fragipan but is so deep in the profile that it does not interfere with aeration in the root zone.

Range in characteristics: In most places the fragipan is at depths of 5 or 6 feet. In some areas it is absent.

Location: Foot slopes at the base of hillsides and mountains. The soils occur in fan-shaped areas along small, steep drainageways and in bands around hills. They are above the flood plains but below steep areas of Gilpin and Dekalb soils.

Slope: Gently sloping to moderately steep (3 to 30 percent).

Drainage: Well drained.

Permeability: Moderate in root zone; slow in fragipan.

Use and management: Very little acreage is in crops and pasture. Shelocta soils have very good moisture conditions and are excellent for timber.

Shelocta silt loam, 3 to 10 percent slopes (Sb). This soil is the one described as typical for the Shelocta series. Under simple management that includes protection from erosion, the few cleared areas are suitable for any crop commonly grown in the County. Management group 3 (IIe–4).

Shelocta silt loam, 10 to 20 percent slopes (Sc).—This soil is similar to that of Shelocta silt loam, 3 to 10 percent slopes, but its slopes are stronger and the hazard of erosion is greater. Management group 11 (IIIe–4).

Shelocta silt loam, 20 to 30 percent slopes (Sd).—The profile of this soil is similar to that described for the Shelocta series. Because of slope, the soil cannot be used so intensively as the Shelocta silt loams on gentler slopes. Management group 20 (IVe–3).

Strip-Mine Spoil

Strip-mine spoil (Se) is a byproduct of strip mining. The spoil consists of a mixture of rocks, coal, and soil. The use of this land type depends on how well the spoil has been leveled and its acidity, texture, and stoniness. See the section, Reclamation of Strip-mine Areas, for information about use and management of these areas.

Tyler Series

The Tyler are somewhat poorly drained claypan soils that occur in association with Monongahela soils on stream terraces that are no longer reached by overflow. The parent material, sediments derived from acid sandstone and shale, was deposited in slack-water areas. The acreage of these soils is very small in Preston County. The largest area is along West Virginia Route 92, about 1 mile south of United States Highway 50.

Typical profile (Tyler silt loam, 0 to 6 percent slopes):

A_p 0 to 10 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak fine granular structure; friable when moist.

A_2 10 to 15 inches, yellowish-brown (2.5Y 6/4) silt loam grading to silty clay loam; moderate fine subangular blocky structure that tends toward platy; firm when moist, slightly plastic when wet.

B_{21} 15 to 18 inches, light yellowish-brown (2.5Y 6/4) silty clay loam; moderately defined medium and coarse blocky structure; very firm when moist, plastic when wet.

B_{21g} 18 to 22 inches, light yellowish-brown (2.5Y 6/4) silty clay loam; 10 percent of surface mottled with yellowish brown (10YR 5/8); moderately defined medium and coarse blocky structure; very firm when moist, very plastic when wet.

B_{22g} 22 to 40 inches, clay loam grading to clay; prominently mottled with about 50 percent light gray (5Y 7/1) and 50 percent brownish yellow (10YR 6/6); massive; firm when moist, very plastic when wet

B_{3g} 40 inches +, light-gray (5Y 7/1) clay prominently mottled with yellowish red (5YR 5/8); massive.

Range in characteristics: Depth to mottling ranges from 12 to 18 inches below the surface. Texture of the B_2 horizon ranges from silty clay loam to clay.

Location: Terrace benches above flood plains.

Slope: Level to gently sloping (0 to 6 percent).

Drainage: Somewhat poor.

Permeability: Very slow in claypan.

Use and management: The very slow permeability, somewhat poor internal drainage, and strong acidity are serious problems in use and management.

Tyler silt loam, 0 to 6 percent slopes (Ta).—This soil, the only Tyler soil mapped in the county, is the one described as typical of the Tyler series. Because of wetness and hazard of erosion, this soil is best kept in hay or pasture. Stock should not be turned out on the soil until it is firm. Normally this will be late in spring. Management group 19 (IIIw–5).

Upshur Series

The Upshur are deep, heavy-textured, well-drained upland soils derived from reddish-brown, soft, more or less calcareous clay shales. They occur only in the southwestern corner of the county in association with Gilpin soils The Upshur soils are very susceptible to erosion. Gullies and slips occur frequently.

Typical profile (Upshur silty clay loam, 10 to 20 percent slopes):

A_p 0 to 6 inches, reddish-brown (2.5YR 5/4) silty clay loam; moderate coarse granular structure; friable when moist.

B_{21} 6 to 20 inches, reddish-brown (2 5YR 4/4) clay, strong medium blocky structure; firm when moist, sticky when wet.

B_{22} 20 to 32 inches, reddish-brown (2 5YR 5/4) and reddish-gray (2 5YR 6/1) clay (color variation is not mottling but is inherited from parent material), strong coarse blocky structure, sticky when wet.

D_r 32 inches +, dusky-red to red clay shales that contain seams that are calcareous, some calcareous nodules.

Range in characteristics: The depth to shale bedrock varies from about 24 to 48 inches. There is some variation in the amount of carbonates in the parent material. Consequently, the reaction of the lower B horizon ranges from strongly acid to neutral within short distances.

Location: Ridges and hillsides.

Slope: Irregular, and in many places a series of benches and steep narrow breaks (3 to 40 percent).

Drainage: Well drained because of rapid surface runoff. Small seepy spots and wet-weather springs are common.

Permeability: Slow to very slow.

Use and management: Their natural fertility is good, but these soils are difficult to work, puddle badly, and erode severely if not carefully handled. Gullies are common, particularly in pastures These soils are good for hay and pasture if carefully managed.

Upshur silty clay loam, 3 to 10 percent slopes (Ua).—The profile of this soil is similar to that described as typical for the series, but a few acres are included that are severely eroded. This soil can be used for row crops if erosion is controlled. Management group 17 (IIIe–15).

Upshur silty clay loam, 10 to 20 percent slopes (Ub).—This soil has the profile described as typical for the series. It can be used for crops if careful management is applied to control erosion. Areas not needed for crops should be kept in hay or pasture, because it is difficult to control erosion and the surface soil is hard to till. Management group 17 (IIIe -15).

Upshur silty clay loam, 20 to 30 percent slopes (Uc).—The profile of this soil is similar to that described for the Upshur series. This soil has stronger slopes and is more susceptible to erosion. It should be used for long-term hay, pasture, or trees. Management group 23 (IVe–15).

Upshur silty clay loam, 20 to 30 percent slopes, severely eroded (Ud).—The profile of this soil is similar to that described for the Upshur series, but most of the original surface layer has been removed by erosion. Plowing has mixed the remaining original surface soil and the heavier subsoil As a result, the plow layer absorbs rainfall more slowly than the original surface layer, and more soil may be lost through runoff. This soil should be used for permanent pasture or trees. Management group 23 (IVe–15).

Upshur silty clay loam, 30 to 40 percent slopes (Ue).—The profile of this soil is similar to that described for the Upshur series Because of slope and erosion, this soil needs to be kept under a permanent plant cover. Management group 26 (VIe 3).

Upshur silty clay loam, 30 to 40 percent slopes, severely eroded (Uf).—This soil is similar to that described for the Upshur series, but most of the original surface soil has been removed by erosion. This soil is useful only as woodland because it is steeply sloping, eroded, and susceptible to more erosion. Management group 31 (VIIe–3).

Wharton Series

The Wharton are deep, moderately well drained claypan soils of the upland that developed on acid clay shales. These soils are on benches, flats, and gentle slopes in upland areas where Gilpin soils are dominant. The Wharton soils are widely used for field crops, hay, and pasture Because their subsoil is heavy and slowly permeable, they are poorly suited to deep-rooted legumes. The surface soil is easily puddled and erodes readily. Many areas of Wharton soils have been strip mined. The clay shales on which these soils formed are normally closely associated with outcrops of coal.

Typical profile (Wharton silt loam, 3 to 10 percent slopes):

A_1 0 to 1 inch, dark grayish-brown (10YR 4/2) silt loam; moderately defined medium granular structure, soft when dry, friable when moist, nonplastic when wet; many fine and coarse roots; strongly acid; clear boundary; layer ranges from 1 to 4 inches in thickness.

A_2 1 to 7 inches, yellowish-brown (10YR 5/4) silt loam; weak fine subangular blocky structure; soft when dry, very friable when moist; many fine and coarse roots; many fine pores, strongly acid, clear boundary; layer ranges from 5 to 9 inches in thickness.

B_{21} 7 to 22 inches, yellowish-brown (10YR 5/4) silty clay loam; strong fine and medium subangular blocky structure; friable when moist, slightly plastic when wet; few fine roots; many coarse and a few fine pores; clay skins prominent; strongly acid; gradual boundary; layer ranges from 10 to 17 inches in thickness.

B_{22g} 22 to 28 inches, gray (10YR 6/1) and brownish-yellow (10YR 6/6) clay; common, fine, faint mottles, strong coarse blocky structure; firm when moist, slightly plastic when wet; a few coarse roots; peds have distinct light-gray (2.5Y 7/2) coatings of silt; strongly

acid; gradual boundary; layer ranges from 4 to 8 inches in thickness.

B_{2g} 28 to 34 inches, gray (10YR 6/1) clay; brownish-yellow (10YR 6/6) mottles are common, medium, and distinct; strongly defined coarse blocky structure and strongly defined medium and coarse prismatic structure; very hard when dry, slightly plastic when wet; strongly acid, gradual boundary; layer ranges from 4 to 8 inches in thickness.

C_1 34 to 40 inches, reddish-yellow and light grayish-brown partially weathered shale, abundant manganese and iron concretions; layer ranges from 5 to 12 inches in thickness.

D_x 40 inches+, unweathered clay shales.

Range in characteristics: The depth to mottling varies from about 18 to 26 inches.

Location: Benches and broad ridgetops.

Slope: The dominant slope is about 10 percent, but the entire range is from 3 to 30 percent.

Drainage: Moderately well drained.

Permeability: Slow in subsoil.

Use and management: Because of the slowly permeable subsoil, these soils warm up slowly in the spring. They puddle badly if worked when too wet. These soils are used for all field crops commonly grown in the county and for hay and pasture. Because of the claypan, they have somewhat limited suitability for deep-rooted legumes and potatoes.

Wharton silt loam, 3 to 10 percent slopes (Wa).—This soil has the profile described as typical of the Wharton series. Slopes are gentle, and erosion is slight or moderate. The soil is suitable for all crops commonly grown in the county. It needs simple practices that will control erosion and maintain good tilth and fertility. Management group 7 (IIe–13).

Wharton silt loam, 3 to 10 percent slopes, severely eroded (Wb).—This soil has a profile similar to the one described as typical for the series, although most of the original surface soil has been removed by erosion. The plow layer is a mixture of the remaining original surface soil and the heavy silty clay loam subsoil. Thus, the plow layer contains less organic matter, is poorer in tilth, and erodes more readily than the plow layer of the less eroded soil on this slope. More intensive management is needed to conserve this soil. Management group 15 (IIIe–13).

Wharton silt loam, 10 to 20 percent slopes (Wc).—The profile of this soil is similar to that described for the series. Because slopes are stronger, its use is somewhat more limited than that of Wharton silt loam, 3 to 10 percent slopes, and more intensive practices are needed to control erosion. If carefully managed, this soil is suitable for crops, hay, or pasture. Management group 15 (IIIe–13).

Wharton silt loam, 10 to 20 percent slopes, severely eroded (Wd).—Erosion has taken off most of the original surface soil, and the slopes are strong. Otherwise, the profile of this soil is similar to that described in detail for the series. The present plow layer is a mixture of the original silt loam surface and the silty clay loam subsoil. It is low in organic matter, has poor tilth, and takes in water slowly. Management group 21 (IVe–9).

Wharton silt loam, 20 to 30 percent slopes (We).—The profile of this soil is similar to that described for the Wharton series. Because of the increased hazard of erosion on these slopes, the most intensive use of this soil should be for hay or pasture. Management group 21 (IVe–9).

Wharton silt loam, 20 to 30 percent slopes, severely eroded (Wf).—The profile of this soil is similar to that described for the Wharton series, although most of the surface soil has been removed by erosion. As a result, moisture is absorbed less readily and more soil may be lost through runoff. To prevent further loss, this soil needs to be kept in grass or trees. Management group 21 (IVe–9).

Genesis and Morphology of Soils

Soils are formed by the forces of the environment acting upon soil materials deposited or accumulated by geologic agencies. The characteristics of a soil at any particular place are determined by (1) the climate under which the soil material has accumulated and has existed since accumulation; (2) the physical and mineralogical composition of the parent material; (3) the relief, or lay of the land, which influences drainage, moisture content, aeration, susceptibility to erosion, and exposure to sun and the elements; (4) the biological forces acting upon the soil material—the plants and animals living in and on the soil; and (5) the length of time the climate and biological forces have acted upon the soil material. Of these factors, the parent materials and the topography, or relief, account for most of the differences among the soils in the county. Climate and vegetation, although important in the development of the soils, are not the factors causing important differences among the soils of this region.

Climate.—Climate influences physical and chemical weathering and the biological forces at work in the soil material. Generally, if adequate moisture is present, the processes that form soils become more active as the soils warm. The processes are slowed by either inadequate or excess moisture.

The soils of Preston County have developed under a cool, moist climate. Abundant rainfall, supplemented by heavy dew and fog during summer nights, provide readily available moisture for plant growth. This abundant rainfall, followed by the percolation of water in the soil, has generally resulted in the leaching and the formation of soils of the podzolic groups. The snow cover has affected the development of the soils by reducing the amount of freezing and thawing and the depth of frost penetration. Alternate freezing and thawing affects the soil aggregates; frost penetration retards biologic activity.

Vegetation and biologic activity.—Plant and animal life provide organic matter for the soils and, to some extent, offset leaching by bringing plant nutrients from the lower layers to the upper layers of the soil. In addition, the humus or decayed organic matter, supplies food for the micro-organisms in the soil.

All of Preston County was originally forested. The forest consisted mostly of oak, beech, maple, chestnut, and other hardwoods (fig 6) but included some white pine and, in low moist areas, hemlock. Hardwood trees are especially deep feeders and return calcium and magnesium to the surface in their leaf litter. However, the return of bases to the surface is not sufficient to balance the loss of bases caused by leaching; consequently, all the soils are acid in the upper part of their profiles.

In the glade areas, sedges, bracken fern, and other herbaceous plants have been important in soil development. They account for the organic layers that extend to depths of as much as 12 inches. In some of these areas are trees and plants that generally occur much farther

Figure 6.—**A Gilpin silt loam, approximately 4 miles south of Kingwood, that developed beneath hardwood forest.**

north. Among these are red spruce, tamarack (only in Pine Swamp), bracken fern, and sphagnum moss.[6]

In addition to returning bases to the surface and supplying organic matter to the soils, the vegetation protects the soils from penetration of frost. In a small area of virgin woodland, mostly hemlock, the soils were examined in midwinter to determine the depth of frost penetration. Following prolonged periods with temperatures below freezing, the mineral soil beneath the mat of leaf litter and organic materials was frozen only to depths of 1 or 2 inches. Soils in nearby pastures were frozen to depths of about 12 inches

Age or time.—The length of time that climate and biological forces have acted upon the soil materials is often difficult to determine. This difficulty arises because some soils develop more rapidly than others As a result, an immaturely developed soil may have the same age as one that is maturely developed. Despite these difficulties, the comparative age of most soils can be estimated from the geologic history of the area, particularly the relative dates at which the parent materials were exposed or deposited.

Soils on the flood plain, the Pope soil, for example, have been in place only a short time and show very little profile development. Dekalb soil materials on steep hillsides have remained in place for a longer period of time and have moderately well developed profiles. On the broad ridgetops where Ravne soils occur, and on terrace benches, the soil-forming processes have acted upon the soil materials long enough to produce mature profiles.

Parent materials.—Generally the properties inherited from parent materials are most pronounced in the younger soils. As the soil-forming processes continue over longer periods of time, both the physical and chemical characteristics of the soil are changed. Many of the differences among the soils in Preston County result from differences in parent materials, and these, in turn, are closely related to the kind of rock from which the soils weathered. About 85 percent of the acreage in the county consists of soils formed in place from the rocks directly beneath them. The slopes are generally steep, and the soils are therefore relatively young. They reflect strongly the characteristics of their parent material. Particularly in the upland soils, there is a close relationship between the texture of the entire profile and the rock from which the profile was formed.

Only sedimentary rocks are exposed in the county. In the northern and western part they generally lie in a horizontal position, but in the eastern part the strata are strongly folded. The rocks are mostly sandstone, siltstone, and shale, but the Greenbrier formation is mainly limestone.

The oldest (Devonian) rocks are those of the Chemung series. They are mostly siltstone, but thin layers of clay shale are present. The Gilpin channery silt loams are the most important soils on these materials. Where the same rock materials are exposed in the eastern part of the State, they are more severely shattered, are more completely leached, and form the parent material for soils of a series not mapped in Preston County, the Ashby soils. Figure 7 shows some of the dominant upland soils and the underlying rock materials. The diagram does not show all the soil-bedrock relationships. For example, some Dekalb soils have formed in parent material from the Chemung formation, and some Clymer soils, from rocks of the Allegheny series

The greatest number of kinds of soil have formed on the Conemaugh and Allegheny formations. These formations outcrop in all parts of the county except the southeastern and contain the important coal veins ("coal measures") in the county. A typical vertical section consists of hard, gray sandstone, siltstone, and clay shale or fire clay. On gentle slopes, where the outcrops generally are wider, each type of rock may be associated with a particular soil type. More commonly, because of slope and erosion, the different rock materials are mixed together. The sandstone that contains much silty material, the siltstone, and the coarser grained shales, all form very silty materials when weathered. Therefore, most of the soils in the area have a silt loam surface soil and silt loam or light silty clay loam subsoil.

The clay shales and fire clays generally occur just below coal seams and contain some weathered coal fragments. These areas are referred to locally as "coal blossom." The Wharton and Cavode soils have developed in these areas. They have a silt loam surface layer and heavy silty clay loam subsoil. The subsoil generally is clayey and slowly permeable, and the underlying shales are slowly permeable.

Thin, discontinuous veins of limestone are present in the Conemaugh and Allegheny formations but are neither thick enough nor extensive enough to have much significance in soil formation.

The Pottsville and Pocono sandstones cause much of the mountainous topography In the southeastern part of the county, the Pottsville formation caps the mountain rim that surrounds the lower areas underlain by the older Chemung rocks. The Pottsville is the important rock formation in the gorge along the Cheat River; it also caps Chestnut Ridge along the Monongalia-Preston county line. The Dekalb soils have developed largely on Pottsville soil material. Sandstone boulders are numerous on the surface and in the soil.

[6] RIGG, G B., and STRAUSBAUGH, P D. SOME STAGES IN THE DEVELOPMENT OF SPHAGNUM BOGS IN WEST VIRGINIA. Castanea 14: 129–148, illus. 1949.

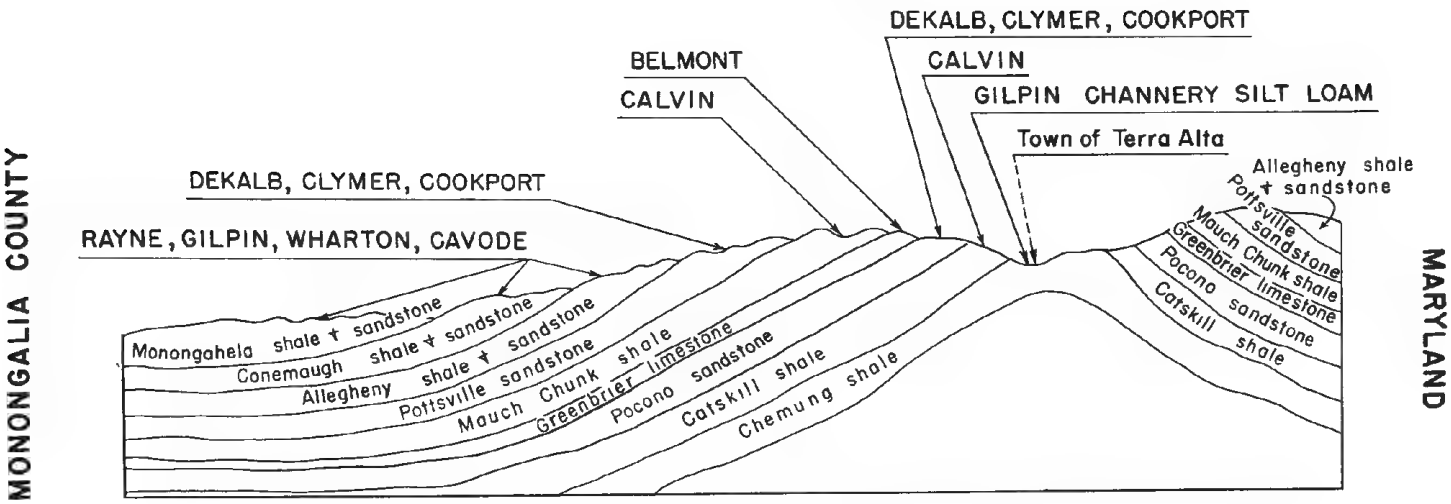


Figure 7.—**Schematic east-west section of Preston County showing dominant upland soils and underlying rocks from which they were derived.**

The Pocono formation is mainly sandstone. It is older than the Pottsville formation and lower in the geologic column. The Pocono formation, like the Pottsville, outcrops as a band above the older Chemung rock. The Pocono formation has some layers, or seams, that if unweathered, contain small amounts of lime The influence of this limy material is not directly apparent, because the soils derived from the formation are strongly acid throughout the profile The Dekalb and Clymer, the most important soils developed from the Pocono material, have also formed on other sandstone material. Where they have formed from Pocono material, they are slightly browner and apparently slightly higher in inherent fertility than where they have formed on other sandstone. The difference, however, is not great enough to justify establishing separate series in the areas underlain by the Pocono rock.

In some areas the upper part of the Pocono formation is a sandstone conglomerate that contains many quartz pebbles ranging from the size of a pea to a small egg. Clymer gravelly loam has developed in these areas, which are known locally as beanstone land. Typical areas of these soils can be seen along United States Highway 50 in the vicinity of Aurora and 3 to 4 miles south of Cranesville on the road from Terra Alta to Cranesville

The Catskill and Mauch Chunk formations look much alike. Both are red to reddish brown, thin-bedded silty shales. The Mauch Chunk soil materials have some lime at depths of 10 feet or more, but the soils that have developed on these materials are not affected by the lime.

The Greenbrier limestone is 150 to 200 feet thick and is exposed only in the southeastern and east-central parts of the county. It occurs near the foot of the mountains that surround the lower areas underlain by Chemung rock. In most places the Greenbrier formation is covered with soil material from the Mauch Chunk formation, which lies just above it. The soil material, therefore, is not exclusively from Greenbrier limestone material; it is a mixture of rock materials. The Greenbrier formation is important, nevertheless, because the Belmont soils were partially derived from this limestone and are the most fertile upland soils in the county.

Relief.—Relief affects movement of water over the surface and in this way influences development of soil in relatively small areas. Each soil type normally can be associated with the degree of slope or the shape of the surface. Together with soil permeability, relief largely accounts for runoff, drainage, and the moisture content of a soil For example, the Atkins soils in the glade areas have a heavy silty clay loam substratum deposited from slowly moving water. Some soils in the glade areas, the Elkins, for example, have an organic surface layer up to 12 inches deep because their poor drainage favored growth of plants, yet slowed decay of the organic material from these plants. In contrast, where steep slopes cause rapid runoff, little water penetrates the soil to influence soil-forming processes, and the surface soil may be removed through erosion. Consequently, thin and immature soils develop.

Table 5 lists the soil series of the county and gives the physiographic position, parent material, drainage, and depth of each. Soil series that have the same parent materials are listed on the same horizontal line. Those having the same kind of drainage are listed in the same vertical column. Some soil series have formed on more than one kind of parent material, and for these the series name is shown for each kind of parent material Figure 8 shows the relationship between topographic position and some of the soils in Preston County.

Classification of the Soils

The soils of Preston County have developed under a cool, moist climate and mixed hardwood vegetation. They have been classified by great soil groups as follows:

Sol Brun Acide (Acid Brown Earth).
Gray-Brown Podzolic soils –
  Intergrading to Red-Yellow Podzolic soils.
  Intergrading to Planosols
  With red color and clayey texture.
Red-Yellow Podzolic soils.
Low-Humic Gley soils.
Humic Gley soils.
Alluvial soils.

Although none of the soil series in Preston County have been classified as typical Gray-Brown Podzolic soils, most

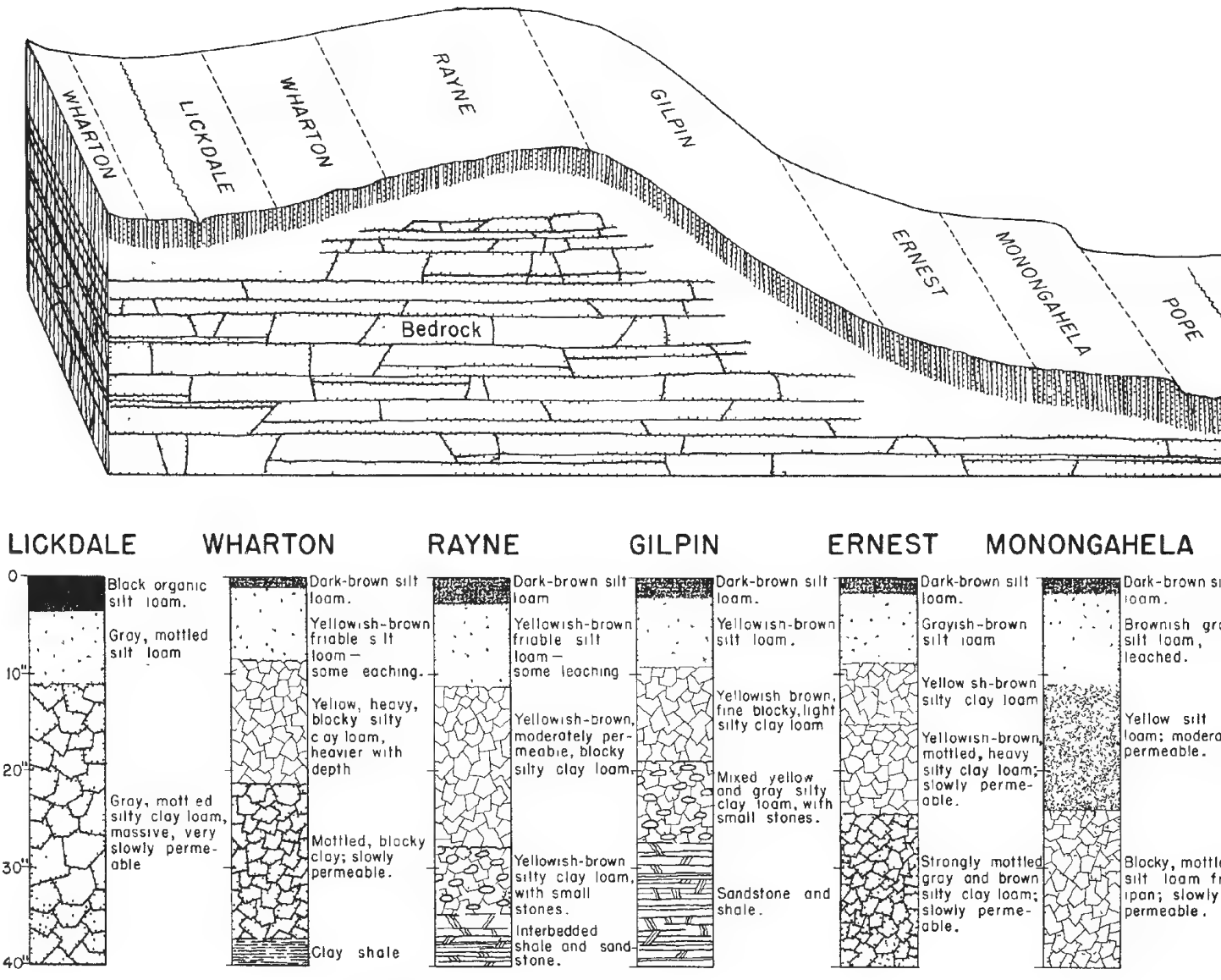


Figure 8. **Schematic diagram showing typical position and profile for several soil series.**

TABLE 5.—*Physiographic position, parent material, drainage, and depth of the soil series*

Parent material	Well drained		Moderately well drained, deep	Somewhat poorly drained, deep	Poorly drained, deep	Very poorly drained, deep
	Shallow and moderately deep	Deep				
Uplands						
Residuum from—						
Acid gray sandstone	Dekalb	Clymer	Cookport			Lickdale.[1]
Acid gray sandstone, siltstone, and shale.	Gilpin	Rayne				Lickdale.[1]
Acid gray clay shale			Wharton	Cavode		Lickdale.[1]
Weakly alkaline red shale, sandstone, and limestone.		Belmont				
Acid red shale, red siltstone, and red sandstone.	Calvin					
Weakly alkaline red clay shale		Upshur				
Colluvial Slopes						
Colluvium from—						
Acid gray sandstone and shale		Shelocta	Ernest	Brinkerton		Lickdale.
Mixed red shale, sandstone, and limestone.			Clarksburg (reddish variant).			
Terraces						
Material from acid sandstone and shale of the uplands			Monongahela			
Slackwater sediments from acid sandstone and shale of the uplands.				Tyler		
Flood Plains						
Alluvium from—						
Acid sandstone and shale of the uplands.		Pope, Sequatchie	Philo		Atkins	Elkins.
Lime-influenced sandstone and shale of the uplands.					Melvin	

[1] Lickdale soils developed from colluvium but are placed here because they occur in small depressions in the uplands, as well as on colluvial slopes.

of the soils have some Gray-Brown Podzolic characteristics. A few soils have the characteristics of Red-Yellow Podzolic soils. The Dekalb soils, which were derived mainly from acid sandstone, have been placed in the Sol Brun Acide (Acid Brown Earth) group. Tables 6 and 7 give the physical and chemical characteristics of five principal soil types in the county.

Sol Brun Acide (Acid Brown Earth)

Soils of the Dekalb and Calvin series are members of this group. The A_1 horizons consist of a 2- to 3-inch layer of organic and mineral material. The A_2 horizons are low in clay and bases. The B horizons show little or no increase in clay and very little change in color from that of the A_2 horizons. A profile of Dekalb loam is described in the section, Soil Descriptions.

Gray-Brown Podzolic soils intergrading to Red-Yellow Podzolic soils

In this group are soils of the Clymer, Cookport, Ernest, Gilpin, Rayne, Shelocta, and Wharton series. These soils possess the following characteristics: Relatively thin organic-mineral A_1 horizons, moderately leached A_2 horizons, and B horizons that show a moderate increase in clay. These soils have grayish-brown A horizons and yellowish-brown B horizons commonly seen in Gray-Brown Podzolic soils. They lack the bright colors in the B horizons of typical Red-Yellow Podzolic soils but do have the low base status of this group of soils.

The Wharton silt loams are representative of the soils in this group, but the clay texture of their B_{22g} and B_{3g} horizons is partially the result of the influence of the clay shale parent material. A profile of Wharton silt loam is described in the section, Soil Descriptions.

Gray-Brown Podzolic soils intergrading to Planosols

The Cavode and Tyler soils have the general characteristics of Gray-Brown Podzolic soils, but they are low in base status, and they change from silt loam in the A horizons to silty clay or clay in the lower B horizons.

TABLE 6.—*Physical characteristics of five principal soil types in Preston County*

[Determinations by Beltsville, Md , Soil Laboratory; sample identification numbers are shown in parentheses following soil name]

Horizon	Depth	Size class and diameter of particles (in mm)							Other classes (in mm.)		
		Very coarse sand (2.0–1 0)	Coarse sand (1 0–0.5)	Medium sand (0 5–0 25)	Fine sand (0.25–0.1)	Very fine sand (0.1–0 05)	Silt (0 05–0.002)	Clay (<0.002)	0.2–0.02	0 02–0.002	>2 0
Belmont silt loam (551241–551246):	*Inches*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
A_p	0–6	1 3	2. 8	2 4	25. 2	18 8	28 5	21 0	45 8	22. 2	(1)
B_1	6–12	2 0	4 2	2 8	21 9	16 6	25. 1	27. 4	40. 0	19 4	(1)
B_2	12–18	2. 0	4 1	3 0	20 4	19 6	21. 7	29. 2	42. 2	15 6	21
B_3	18–25	3. 8	5 0	1. 9	10 0	42 8	16. 5	20. 0	60 6	7 0	31
C_1	25–35	2. 9	4. 4	1 6	11 8	51. 7	18. 0	9 6	75 4	4 6	32
C_2	35–43	. 7	2. 2	2 1	15. 0	48. 3	11. 7	20 0	66. 6	6 4	0
Calvin silt loam (551216–551221):											
A_1	0–2	9 5	3. 2	2. 4	10 0	11. 8	44 7	18 4	34 1	28. 7	6
A_2	2–8	1 4	2 2	1 7	7 7	10. 4	47 7	28 9	32 5	30 6	19
A_3	8–12	2. 8	2 7	2 2	8 1	11. 4	48 5	24 3	35. 6	29 6	18
B_{21}	12–18	2 9	3 2	2 4	7 3	12 0	52. 0	20 2	37 6	31. 2	17
B_{22}	18–25	2 0	2. 7	2 0	5 8	10 4	55. 5	21. 6	36 0	33. 6	15
B_3	25–32	4 9	4. 3	2 5	6 3	9. 6	49 3	23 1	32 8	30 1	20
Calvin silt loam (551236–551240):											
A_p	0–5	1 8	2 1	1. 4	9. 4	21. 9	41. 3	22 1	42. 7	27. 9	5
B_1	5–10	3. 9	2. 8	1. 3	8 7	25. 2	33. 2	24. 9	42 9	22. 7	14
B_2	10–14	3 8	4. 9	2 3	10 3	29 5	26 0	23. 2	46 4	17. 5	25
B_3	14–18	5. 6	9 1	3 6	11 1	28 8	23 4	18 4	47 4	13. 6	37
C	18–28+	7. 6	8 8	3. 1	9 8	26 6	27. 7	16 4	45 0	16 9	42
Dekalb sandy loam (551204–551208):											
A_1	0–3	6 7	10 1	9 8	20 7	17 0	25 4	10 3	39 5	15 5	10
A_2	3–9	5. 2	11. 0	10 5	19 0	14 6	27 0	12 7	35 4	17. 4	32
B_2	9–16	6 8	11. 0	9. 8	18 8	15 5	26 2	11 9	36 6	16 3	19
B_3	16–23	8 2	12 2	9 8	18. 0	16 7	24. 3	10. 8	37 3	14. 6	31
C_1	23–34	8. 6	14. 3	12 8	20. 6	16 7	18 3	8 7	37 9	9 0	29
Gilpin silt loam (551222–551228):											
A_1	0–2	3 5	3. 7	2. 7	11. 5	9 4	45 8	23 4	30 2	32 6	16
A_2	2–4½	2 5	2. 8	2 4	10 8	9 2	47 1	25 2	29 0	34 3	23
A_3 or B_1	4½–8	2. 3	2 6	2 4	11 1	9 4	46 2	26 0	29 9	32 8	24
B_{21}	8–12	2. 8	3. 3	2 6	9 3	8 9	42 5	30 6	26 6	30. 6	14
B_{22}	12–18	4 4	4 0	2 2	7 1	7 4	46 9	28 0	26 6	32 1	17
C	18–23	3 0	2. 9	1 5	4 3	6 3	52 8	29 2	25 8	36 1	14
D	23+	3 5	3. 9	1 3	2 8	9 6	55 6	23 3	33. 6	33 4	22
Wharton silt loam (551247–551253)											
A_1	0–1	4 6	3 4	3 1	6 7	6 6	50 9	24. 7	23 8	37 6	(1)
A_2	1 7	1 1	1 2	2 1	4 2	4 3	55 8	31 3	17 8	44 9	(1)
B_{21}	7–14	9	1 1	1 5	3 2	3 0	43 4	46 9	11 6	36. 7	(1)
B_{22}	14–22	2 6	2 6	2 8	5 0	4 2	41 5	41 3	15 5	33. 1	6
B_{23g}	22–28	3 9	3 3	2 5	4 1	3 8	51 1	31 3	17 6	39 7	3
B_{3g}	28–34	3 0	2 4	1 6	2 7	3 1	54 2	33 0	17 3	41 7	(1)
C	34+	10 0	8 0	2 0	2 2	3 2	64 4	10 2	22 8	46 1	29
Wharton silt loam (551229–551235)											
A_2	0–5	2 3	7 1	3. 9	4 2	2 1	55 5	24 9	13 1	46 5	10
A_3	5–8	3 2	6 0	3 0	3 3	2 0	49 8	32 7	11 3	42. 1	7
B_1	8–13	3 1	4 3	2 1	2 3	1 5	38 9	47 8	7. 1	34. 5	7
B_{21}	13–23	1 5	1. 6	. 7	1 2	2 5	43 7	48 8	11 7	35 2	6
B_{22g}	23–28	2 5	2 1	. 9	1 3	3 0	50 0	40. 2	14 2	39. 6	(1)
B_{3g}	28–34	4	. 4	. 2	4	9	40 3	57 4	4 2	37 3	0
C	34–40	1 4	. 9	. 5	9	1 5	44 6	50 2	4 8	41. 9	(1)

[1] Less than 1 percent.

Although these textural characteristics resemble those of true Planosols, the change of texture from the A to the B horizons is not so abrupt as in typical Planosols. Representative profiles for Cavode and Tyler soils are described in the section, Soil Descriptions.

Gray-Brown Podzolic soils with red color and clayey texture

In this group are soils of the Belmont and Upshur series. The soils of both series have relatively high base saturation (see data for Belmont soil in table 7). Their

TABLE 7.—*Chemical characteristics of five principal soil types in Preston County*

[Determinations by Beltsville, Md., Soil Laboratory; sample identification numbers shown in parentheses following soil name]

Horizon	Depth	pH (saturated paste)	Exchangeable cations (m.e./100 gm.)					Cation exchange capacity	Organic carbon	Base saturation
			Ca	Mg	H	Na	K			
Belmont silt loam (551241–551246):								*M e /100 gm*	*Percent*	*Percent*
A_p	0–6	6 2	8 2	<0 1	7 8	0 2	0 5	16 7	1. 77	53
B_1	6–12	6 4	7 4	3	5 8	. 1	3	13. 9	. 40	58
B_2	12–18	6 4	7 8	. 3	5. 8	. 2	3	14. 4	. 22	60
B_3	18–25	5 2	3 2	. 1	7. 8	. 2	. 2	11 5	. 09	32
C_1	25–35	4. 8	. 6	. 2	6. 4	. 2	. 2	7. 6	. 04	16
C_2	35–43	4. 8	. 8	. 3	10 0	. 3	. 2	11. 6	. 03	14
Calvin silt loam (551216–551221):										
A_1	0–2	4. 1	. 9	5	34. 1	. 3	. 5	36 3	8 80	6
A_2	2–8	4. 5	2	<. 1	18 8	. 2	. 4	19 6	1 86	4
A_3	8–12	4 6	<. 1	<1	13 4	2	. 2	13 8	63	3
B_{21}	12–18	4 6	1	<1	10. 2	1	. 2	10 6	. 21	4
B_{22}	18–25	4. 6	2	<. 1	9 5	. 2	. 2	10 1	. 11	6
B_3	25–32	4 6	< 1	<1	9 2	. 1	. 2	9. 5	. 10	3
Calvin silt loam (551236–551240)										
A_p	0 -5	5 9	8 6	4	10 9	. 2	4	20 5	2. 64	47
B_1	5–10	5. 2	2 5	<. 1	9. 2	. 2	3	12 2	. 64	25
B_2	10–14	4 9	1 0	<. 1	9 6	2	. 2	11 0	. 21	13
B_3	14–18	4 8	7	<. 1	8 8	2	. 2	9 9	. 06	11
C	18–28+	4 8	. 5	<1	6 7	. 1	. 2	7 5	. 04	11
Dekalb sandy loam (551204–551208)										
A_1	0–3	4. 5	1 0	3	17 5	1	. 3	19 2	4 04	9
A_2	3–9	4 8	1	<. 1	9. 2	. 2	. 2	9 7	1 08	5
B_2	9–16	4 7	1	<. 1	5 7	. 2	. 2	6 2	. 31	8
B_3	16–23	4 8	< 1	<1	4 8	. 2	. 2	5 2	. 07	8
C_1	23–34	4 8	. 2	3	4 1	. 2	. 1	4 9	. 04	16
Gilpin silt loam (551222-551228)										
A_1	0–2	4 5	. 6	. 3	22 9	. 2	. 4	24 4	5 20	6
A_2	2–4½	4 7	2	. 1	16 7	<1	. 2	17 2	2 46	3
A_3 or B_1	4½–8	4 7	. 1	. 1	14 1	<. 1	2	14. 5	1. 44	3
B_{21}	8–12	4 6	. 5	. 1	11 2	<. 1	. 2	12 0	. 47	7
B_{22}	12–18	4 6	. 9	<1	11 0	<. 1	. 2	12 1	. 18	9
C	18–23	4 8	1	. 2	9 4	<. 1	. 1	9 8	. 11	4
D	23+	4 7	<1	. 1	8 9	<. 1	. 1	9 1	. 10	2
Wharton silt loam (551247–551253):										
A_1	0–1	4 2	1. 8	2	34 4	. 1	. 5	37 0	9 20	7
A_2	1–7	4 5	. 2	2	19 0	1	2	19 7	2. 10	4
B_{21}	7–14	4. 3	. 5	2	20 4	. 2	. 3	21 6	. 68	6
B_{22}	14–22	4 3	. 1	. 2	18 2	. 1	. 2	18 8	. 54	3
B_{23g}	22–28	4 4	2	. 2	22 2	. 1	. 2	22 9	3 03	3
B_{3g}	28–34	4 4	<1	. 1	25 2	. 1	. 2	25 6	2 87	2
C	34+	4 5	7	. 4	12 0	. 2	. 2	13 5	. 33	14
Wharton silt loam (551229-551235):										
A_2	0–5	4 8	1 6	. 5	13 4	<. 1	. 3	15. 8	2. 11	15
A_3	5–8	4 7	8	. 3	12 6	<. 1	. 3	14 0	. 71	10
B_1	8 -13	4 6	1. 0	. 3	18 4	<. 1	. 3	20 0	. 58	8
B_{21}	13–23	4 6	1. 0	. 4	18. 0	<. 1	. 2	19 6	. 32	8
B_{22g}	23–28	4 8	9	3	15 4	<1	. 2	16 8	. 20	8
B_{3g}	28–34	4. 8	1 4	2	17 1	<1	. 3	19. 0	. 17	10
C	34–40	4 9	2 1	. 2	17 1	. 2	. 3	19 9	09	14

B horizons have blocky structure and are clayey. On the basis of these properties, the soils are classed as Gray-Brown Podzolic, even though they have reddish-brown colors that are inherited from the red shale parent material. Representative profiles for Belmont and Upshur soils are described in the section, Soil Descriptions.

Red-Yellow Podzolic soils

Only one soil series, the Monongahela, is in this group. Soils of this series have thin A_1 horizons in which the organic matter is largely mixed with mineral matter; fairly prominent A_2 horizons; and B horizons with pronounced clay accumulation. The texture of the B horizons is usually one class finer than the texture of the A_2 horizons, and clay coatings are prominent on peds, along root channels, and in pores. The B horizons have moderate strong blocky structure and yellow or brownish-yellow colors. The base status of the profile is low. A profile of a Monongahela soil is described in the section, Soil Descriptions.

Low-Humic Gley soils

In this group are soils of the Atkins, Brinkerton, and Melvin series. They have fairly thin, dark-gray surface layers, faintly mottled, grayish-brown silt loam A_2 horizons, and intensely mottled silty clay loam B horizons. They have better surface drainage than Humic Gley soils; consequently, these soils are not so intensely gleyed and

have lighter colored surface soils than the Humic Gleys. The upper 10 or 12 inches of the soil profiles is not saturated for part of the year. Representative profiles of Atkins and Brinkerton soils are described in the section, Soil Descriptions.

Humic Gley soils

In this group are soils of the Elkins and Lickdale series. These soils have very dark gray or black surface layers high in organic matter. The surface horizons are underlain by gray, highly mottled mineral soil material. They are entirely saturated for long periods and, therefore, are gleyed and mottled to the surface or to the top of the mineral layers. A representative profile for the Humic Gley group is that given for the Lickdale series in the section, Soil Descriptions.

Alluvial soils

In this group are soils of the Philo, Pope, and Sequatchie series. The soil materials of these soils were deposited on bottom lands along streams in relatively recent times. Because the soils in this group are of recent age, they have not developed distinct profile characteristics. Their surface layers are thin and dark colored. The subsoil materials are almost uniform in color and texture, and they show little or no soil horizon development. Profiles of these soils are described in the section, Soil Descriptions.

General Nature of the Area

This section is provided mainly for those readers who are not familiar with Preston County. It tells about the climate, physiography, relief, and drainage of the county and indicates the development of agriculture.

Climate

Winters are long and the growing season is comparatively short for the latitude. Differences in elevation and in exposure cause marked variation in temperature and precipitation. Table 8 shows annual temperature and precipitation at Terra Alta in the eastern part of the county. At that station average annual temperature is 48.4° F., and extreme range is from 95° to —24°. The growing season ranges from about 130 days at Terra Alta to 150 days in the western part of the county.

The average annual precipitation for the county is about 50 inches. The average for the western part of the county, where elevations are lower, is about 44 inches, and that in the higher eastern part is about 54 inches. Although the rainfall is generally well distributed throughout the growing season, it is slightly higher during May, June, July, and August. Short droughts may occur at any time during the growing season but are more common in August and September.

Snow covers the ground most of the time during winter. The average snowfall at Terra Alta is 75 inches. At Rowlesburg, one of the lowest spots in the county, the snowfall is only 53 inches.

Physiography, Relief, and Drainage

Preston County lies in the unglaciated Allegheny Plateau. The overall topography is that of a high, but strongly dissected plateau, sharply cut by the Cheat River gorge. The rugged Briery Mountains and Laurel Ridge rise above the general level of the plateau in the eastern part of the county. Chestnut Ridge rises above the plateau level along the western boundary. These parallel ridges are anticlinal uplifts of sedimentary rock. The rock strata have considerable thicknesses and consist of sandstone, limestone, and shale.

The northern and western part of the county is mainly an area of foothills, the summits of which range from about 1,500 to 2,300 feet in elevation. The southeastern part of the county is mountainous; summits range from about 2,500 to 3,300 feet. The area from Aurora northward through Terra Alta to Cranesville has the smoothest topography in the eastern part of the county, and the average elevation is about 2,600 feet. The highest elevation in the county is 3,380 feet, on Backbone Mountain near the Maryland State Line. The lowest elevation is 875 feet near where the Cheat River leaves the county. Many of the hillside slopes in the county are long and steep. At the base of these slopes are thick colluvial deposits that have either washed down the slope or worked down under the pull of gravity.

The drainage pattern and distribution of alluvial deposits reflect the complex geological history of the area.

TABLE 8.—*Normal monthly, seasonal, and annual temperature and precipitation at Terra Alta, Preston County, W. Va.*

[Elevation, 2,559 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1930)	Wettest year (1907)	Average snowfall
	°F	°F	°F	Inches	Inches	Inches	Inches
December	30 6	74	—18	4 74	3 74	9 31	13. 6
January	27 9	72	—20	4. 88	1 78	7. 28	18 2
February	28 8	75	—24	3. 59	2. 67	4. 16	16. 1
Winter	29. 1	75	24	13. 21	8 19	20. 75	47. 9
March	37 9	82	—11	4. 44	2 20	7. 36	12 4
April	46 8	85	6	4 10	3 17	2. 92	7. 9
May	57 4	93	24	4 98	3 35	6 37	. 3
Spring	47. 4	93	—11	13. 52	8. 72	16 65	20 6
June	64 7	92	29	6. 18	5 30	5. 05	0
July	68 2	95	33	5. 24	2 05	10 83	0
August	66. 8	94	33	5 01	2 86	5 70	0
Summer	66. 6	95	29	16. 43	10. 21	21 58	0
September	61 8	90	25	3 71	1. 97	7. 03	[3]
October	49 0	86	11	3 89	1 04	4. 73	1. 2
November	40 6	77	—12	3. 20	1. 79	4. 77	5. 4
Fall	50 5	90	—12	10. 80	4 80	16. 53	6. 6
Year	48. 4	95	—24	53 96	31. 92	75. 51	75 1

[1] Average temperature based on a 41-year record, through 1942; highest and lowest temperatures on a 34-year record, through 1930

[2] Average precipitation based on a 37-year record, through 1942; wettest and driest years based on a 33-year record, in the period 1900–1943; snowfall based on a 29-year record, through 1930

[3] Trace.

Only small alluvial deposits occur along the larger streams. The Cheat River and most of its larger tributaries flow in deep, steep-sided gorges where there is little room for floodplains. The fall is rapid. North of Kingwood the descent of the Cheat River is about 25 feet per mile between Albright and the Monongalia County line. Old terrace deposits, high above present stream levels, are clues to former drainage systems. Although many old terraces have eroded almost completely away, a few remnants remain. Typical remnants are along Big Sandy Creek, opposite Clifton Mills; and along West Virginia Route 92, about a mile south of Fellowsville.

Among the interesting physiographic features of the county are the glade areas that generally occur near the heads of streams. In size, these areas range from about 5 acres to a square mile. They were formed by sandstone barriers, usually Pottsville or Pocono strata, that dip upstream and impede the drainage of the areas.

Agricultural Statistics

The statistics given in the following pages are based on reports of the United States Census of Agriculture or have been taken directly from those reports.

Land use.—In 1954, 229,750 acres, or 55.6 percent of the land area in Preston County, was in farms. Table 9 shows the number of farms, average size of farms, and land in farms in stated years. The trend in recent years has been toward a smaller proportion of the county in farms and less improved land per farm.

In 1954 about 20 percent of the land in farms was cropland harvested, and nearly 9 percent was cropland used only for pasture and cropland left idle or fallow. The total cropland therefore was about 29 percent of all the land in farms. Land use was reported in 1954 as follows:

	Acres
Cropland:	
Harvested	46, 013
Used only for pasture	15, 317
Not harvested and not pastured	4, 961
Woodland:	
Pastured	33, 560
Not pastured	63, 930
Pasture (not cropland and not woodland)	58, 917
Other land (house lots, roads, wasteland, etc)	6, 992

TABLE 9.—*Number of farms, average size, and land in farms*

Year	Farms		Land in farms		
	Number	Average size	Total	Proportion of county in farmland	Proportion of farmland improved
		Acres	*Acres*	*Percent*	*Percent*
1954	2, 060	111 5	229, 720	55 6	16 1
1950	2, 486	102 6	255, 137	62 0	22 0
1940	2, 594	97. 0	251, 622	61 0	25. 9
1930	2, 162	116 2	251, 140	60 4	26 1

TABLE 10.—*Acreage of principal crops in stated years*

Crop	1929	1939	1949	1954
Corn for all purposes	9, 445	10, 114	6, 475	5, 781
Harvested for grain	8, 620	9, 510	5, 871	5, 048
Cut for silage	744	475	472	638
Hogged or grazed, or cut for green or dry fodder	81	129	132	95
Small grains threshed or combined:				
Wheat	2, 537	4, 004	2, 774	2, 071
Oats	9, 529	[1] 9, 056	5, 525	5, 046
Barley	63	9	325	662
Buckwheat	7, 718	5, 220	2, 831	2, 083
Rye and other small grains	54	55	13	17
Soybeans grown for all purposes	119	374	215	265
Hay crops	27, 350	28, 429	[2] 30, 941	[3] 29, 685
Irish potatoes for home use and for sale	1, 278	997	466	240

[1] Includes oats cut and fed unthreshed.
[2] Excludes 164 acres of soybeans cut for hay.
[3] Excludes 182 acres of soybeans cut for hay.

Crops.—The acreages of principal crops in stated years are shown in table 10. In 1954, hay crops accounted for approximately 57 percent of the acreage in crops. Corn and oats, in nearly equal proportion, made up 21 percent of the acreage in crops. Buckwheat and wheat were grown on most of the remaining acreage.

In 1929, 1939, and 1949, clover, timothy, and mixtures of clover and grasses averaged about 88 percent of the total acreage in hay. In 1954, however, clover, timothy, and mixtures of clover and grasses made up only 70 percent of the acreage in hay. In that year approximately 21.7 percent of the acreage in hay was in alfalfa and alfalfa mixtures. The acreage in Irish potatoes declined from 1,278 acres in 1929 to 240 acres in 1954.

Livestock.—The number of livestock on farms in stated years is shown in table 11. In the period 1930–54, the number of cattle has increased slightly, the number of

TABLE 11.—*Number of livestock of all ages on farms*

Livestock	1930	1940	1950	1954
Cattle	16, 135	[1] 14, 838	19, 928	19, 983
Cows milked	4, 199	7, 392	7, 761	7, 235
Horses and mules	3, 727	[1] 3, 544	2, 421	1, 275
Swine	7, 709	[2] 5, 883	7, 079	7, 165
Sheep	18, 673	[3] 8, 764	6, 250	3, 801
Chickens	[1] 106, 926	[2] 102, 394	[2] 89, 698	[2] 94, 785
Turkeys raised	[4] 2, 352	[4] 1, 736	[4] 807	3, 454
Ducks raised	[4] 1, 668	[4] 418	[4] 250	911

[1] Over 3 months old.
[2] Over 4 months old.
[3] Over 6 months old.
[4] One year earlier than year given at head of column

swine has remained fairly even, and the number of sheep has decreased very sharply.

Sizes of farms.—The farms averaged 111.5 acres in size in 1954 (see table 9). The 1954 census groups the farms by size as follows:

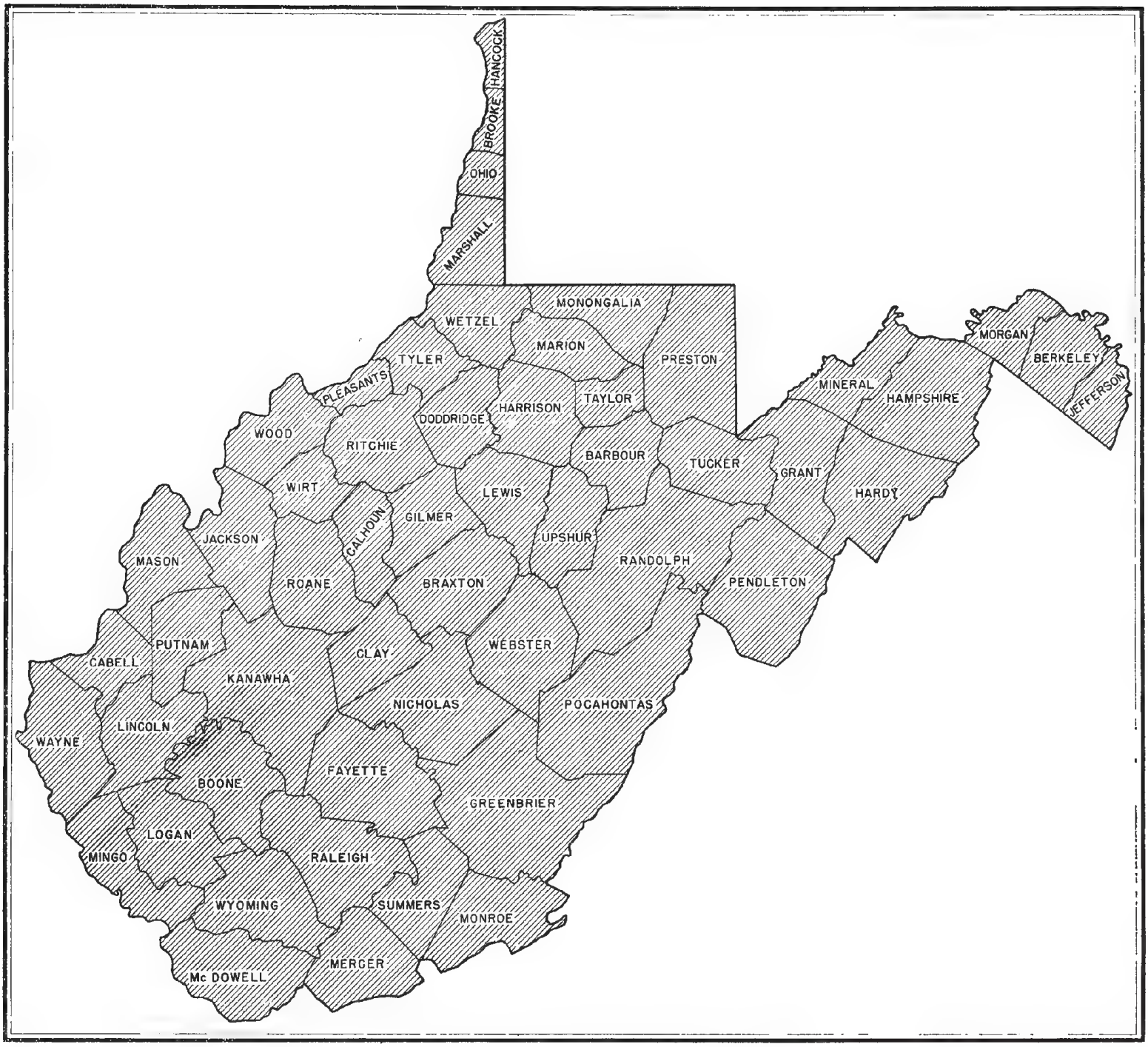
Acres	*Number*
Under 10	171
10 to 29	263
30 to 49	228
50 to 69	218
70 to 99	306
100 to 139	333
140 to 179	191
180 to 219	110
220 to 259	70
260 to 499	134
500 to 999	31
1,000 and over	5

Types of farms.—The 1954 census reported 2,060 farms in the county. Of these, 1,325 farms were miscellaneous and unclassified; that is, farms producing mainly for the farm household, part-time farms, and the like. The remaining farms, about 36 percent of the total, were classified by major source of income as follows:

	Number
Dairy farms	265
Livestock farms other than dairy or poultry	255
General farms	95
Primarily crop	25
Primarily livestock	25
Crop and livestock	45
Poultry farms	65
Field-crop farms other than vegetable and fruit-and-nut	50
Fruit-and-nut farms	5

Farm tenure.—Most of the farmers in the county own the land they work. Only 4.5 percent of the farms are operated by tenants. According to the 1954 census, ownership is reported by number of farms, and acreage, as follows:

	Number of farms	*Acres in farms*
Full owners	1,833	197,390
Part owners	131	20,197
Managers	3	3,162
All tenants	93	8,971
Cash tenants	15	889
Share-cash tenants	3	190
Share tenants	8	1,179
Croppers	5	1,489
Other and unspecified tenants	62	5,224



Areas surveyed in West Virginia shown by shading.

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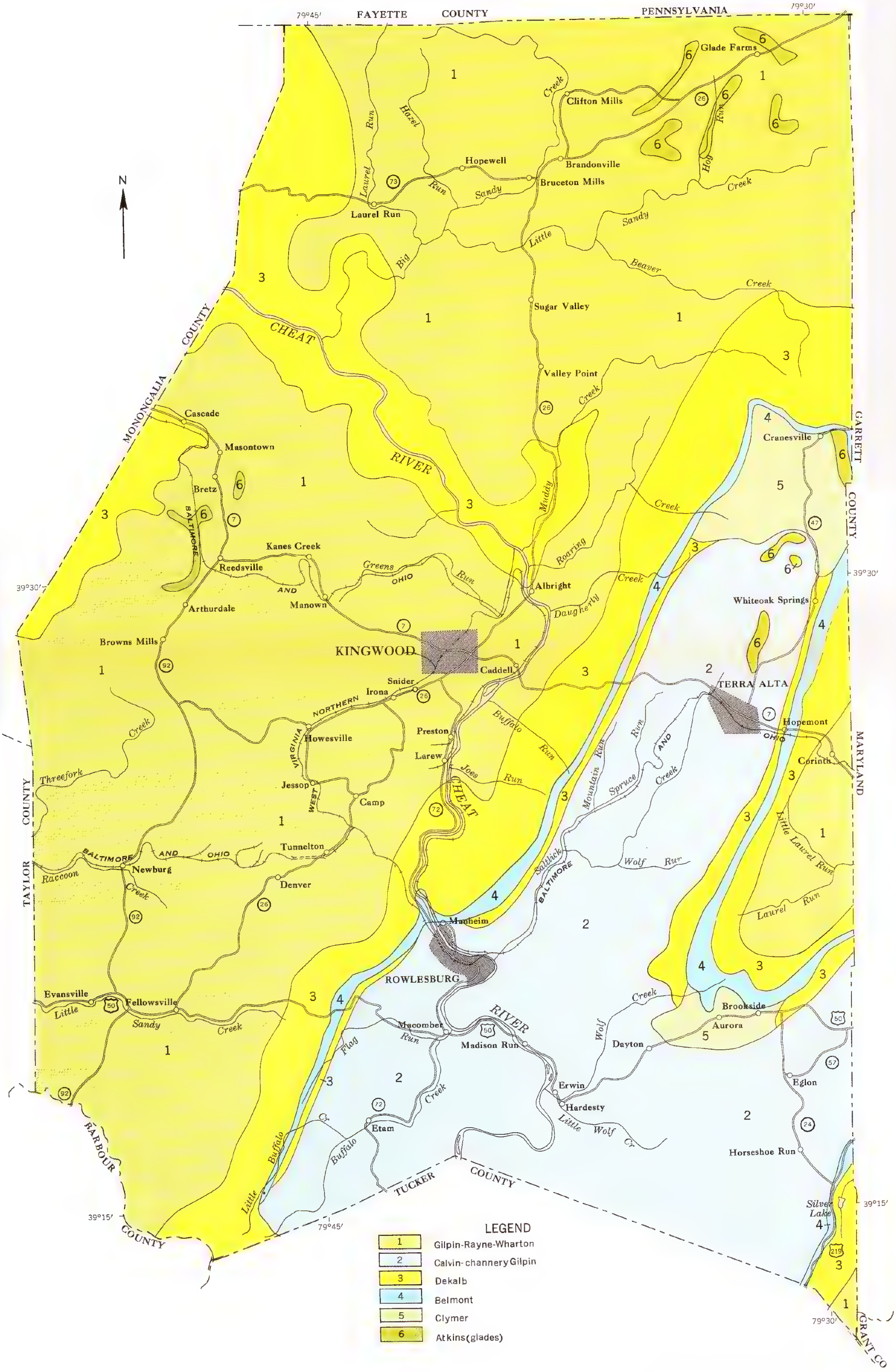
GENERAL SOIL AREAS
PRESTON COUNTY
WEST VIRGINIA



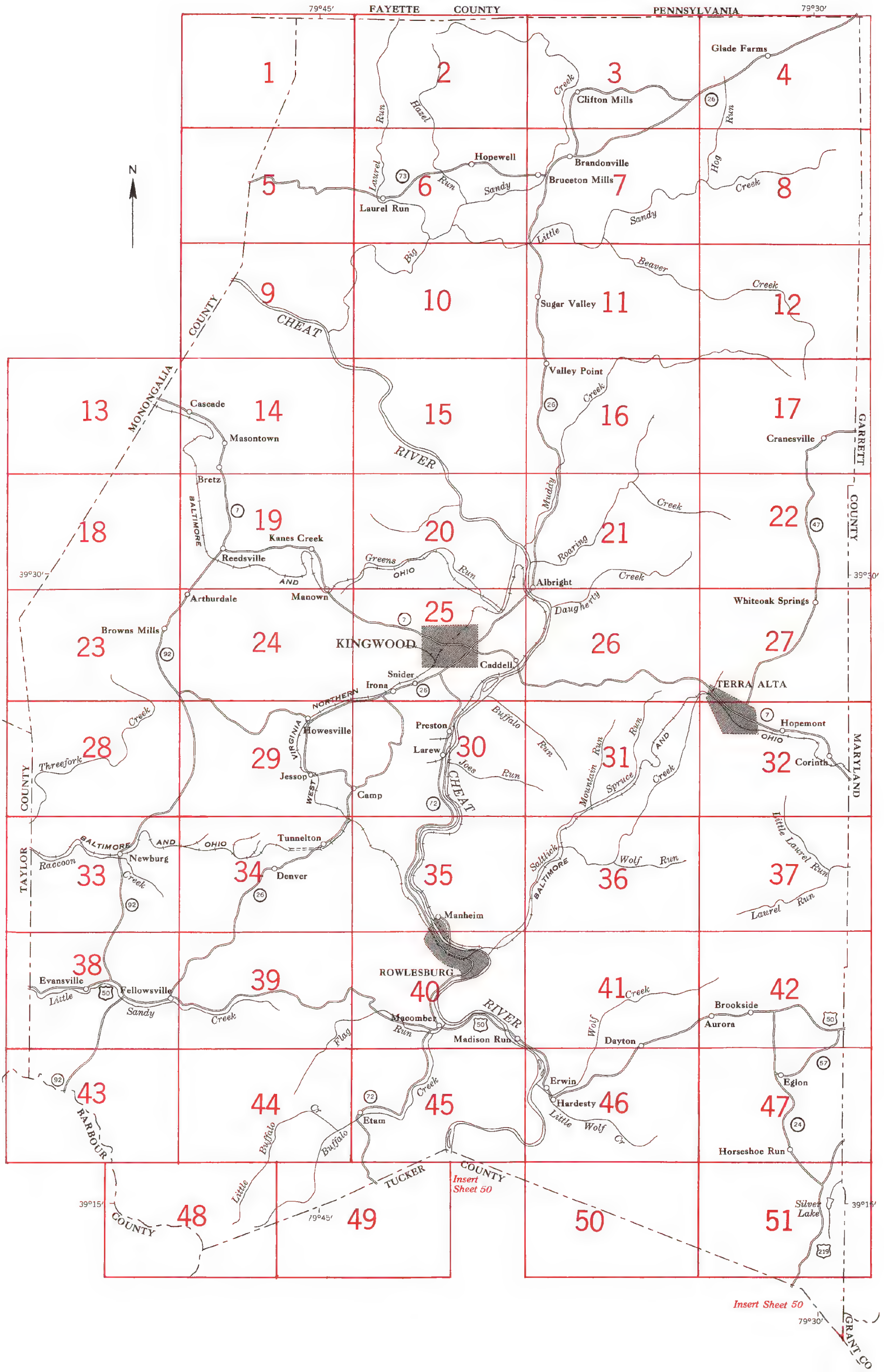
LEGEND

1	Gilpin-Rayne-Wharton
2	Calvin-channery Gilpin
3	Dekalb
4	Belmont
5	Clymer
6	Atkins(glades)

INDEX TO MAP SHEETS

PRESTON COUNTY

WEST VIRGINIA



CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S. (33)

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Rai road
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect
- Pits, gravel or other

Power line
Pipeline
Cemetery
Dam
Levee
Tank
Oil well
Windmill
Canal lock (point upstream)

BOUNDARIES

- National or state
- County
- Township, civil (indefinite)
- U. S.
- Section
- City (corporate)
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.
- Crossable with tillage implements

Canals and ditches (CANAL / DITCH)

Lakes and ponds
- Perennial
- Intermittent

Wells (flowing)
Springs
Marsh
Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions (Large / Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

- Soil type outline and symbol (Dx)
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land

Erosion
- Uneroded spot (u)
- Sheet, moderate (s)
- Sheet, severe (ss)
- Gully, moderate (g)
- Gully, severe (gg)
- Sheet and gully, moderate (sg)
- Wind, moderate
- Wind, severe
- Blowout
- Wind hummock
- Overblown soil

Gullies
- Crossable with tillage implements
- Not crossable with tillage implements

Areas of alkali and salts
- Strong (A)
- Moderate (M)
- Slight (S)
- Free of toxic effect (F)
- Sample location (• 26)
- Saline spot (+)

SOILS LEGEND

SYMBOL	NAME
Aa	Atkins silt loam
Ab	Atkins silty clay loam
Ba	Belmont silt loam, 3-10 percent slopes
Bb	Belmont silt loam, 10-20 percent slopes
Bc	Belmont silt loam, 20-30 percent slopes
Bd	Belmont silt loam, 30-40 percent slopes
Be	Belmont silt loam, 40-65 percent slopes
Bf	Belmont stony silt loam, 10-20 percent slopes
Bg	Belmont stony silt loam, 20-30 percent slopes
Bh	Belmont stony silt loam, 30-40 percent slopes
Bk	Brinkerton silt loam, 0-3 percent slopes
Bm	Brinkerton silt loam, 3-10 percent slopes
Bn	Brinkerton stony silt loam, 0-15 percent slopes
Ca	Calvin silt loam, 3-10 percent slopes
Cb	Calvin silt loam, 10-20 percent slopes
Cc	Calvin silt loam, 10-20 percent slopes, severely eroded
Cd	Calvin silt loam, 20-30 percent slopes
Ce	Calvin silt loam, 20-30 percent slopes, severely eroded
Cf	Calvin silt loam, 30-40 percent slopes
Cg	Calvin silt loam, 30-40 percent slopes, severely eroded
Ch	Calvin silt loam, 40-65 percent slopes
Ck	Calvin silt loam, 40-65 percent slopes, severely eroded
Cm	Cavode silt loam, 3-10 percent slopes
Cn	Cavode silt loam, 3-10 percent slopes, severely eroded
Co	Cavode silt loam, 10-20 percent slopes
Cp	Clarksburg silt loam, reddish variant, 3-10 percent slopes
Cr	Clarksburg silt loam, reddish variant, 10-20 percent slopes
Cs	Clymer gravelly loam, 3-10 percent slopes
Ct	Clymer loam, 0-3 percent slopes
Cu	Clymer loam, 3-10 percent slopes
Cv	Clymer loam, 10-20 percent slopes
Cx	Cookport silt loam, 3-10 percent slopes
Cy	Cookport stony silt loam, 5-20 percent slopes
Da	Dekalb channery sandy loam, 3-10 percent slopes
Db	Dekalb channery sandy loam, 10-20 percent slopes
Dc	Dekalb channery sandy loam, 20-30 percent slopes
Dd	Dekalb channery sandy loam, 30-40 percent slopes
De	Dekalb channery sandy loam, 40-65 percent slopes
Df	Dekalb loam, 3-10 percent slopes
Dg	Dekalb loam, 10-20 percent slopes
Dh	Dekalb loam, 10-20 percent slopes, severely eroded
Dk	Dekalb loam, 20-30 percent slopes
Dm	Dekalb loam, 20-30 percent slopes, severely eroded
Dn	Dekalb loam, 30-40 percent slopes
Do	Dekalb loam, 30-40 percent slopes, severely eroded
Dp	Dekalb stony loam, 5-20 percent slopes
Dr	Dekalb stony loam, 20-30 percent slopes
Ds	Dekalb stony loam, 30-40 percent slopes
Dt	Dekalb stony loam, 40-65 percent slopes
Du	Dekalb stony sandy loam, 5-20 percent slopes
Dv	Dekalb stony sandy loam, 20-30 percent slopes
Dw	Dekalb stony sandy loam, 30-40 percent slopes
Dx	Dekalb stony sandy loam, 40-65 percent slopes
Ea	Elkins silty clay loam
Eb	Ernest silt loam, 3-10 percent slopes
Ec	Ernest silt loam, 3-10 percent slopes, severely eroded
Ed	Ernest silt loam, 10-20 percent slopes
Ee	Ernest silt loam, 20-30 percent slopes
Ef	Ernest stony silt loam, 3-20 percent slopes
Eg	Ernest stony silt loam, 20-30 percent slopes
Ga	Gilpin-channery silt loam, 3-10 percent slopes
Gb	Gilpin channery silt loam, 10-20 percent slopes
Gc	Gilpin channery silt loam, 10-20 percent slopes, severely eroded
Gd	Gilpin channery silt loam, 20-30 percent slopes
Ge	Gilpin channery silt loam, 20-30 percent slopes, severely eroded
Gf	Gilpin channery silt loam, 30-40 percent slopes
Gg	Gilpin channery silt loam, 30-40 percent slopes, severely eroded
Gh	Gilpin channery silt loam, 40-65 percent slopes
Gk	Gilpin silt loam, 3-10 percent slopes
Gm	Gilpin silt loam, 3-10 percent slopes, severely eroded
Gn	Gilpin silt loam, 10-20 percent slopes
Go	Gilpin silt loam, 10-20 percent slopes, severely eroded
Gp	Gilpin silt loam, 20-30 percent slopes
Gr	Gilpin silt loam, 20-30 percent slopes, severely eroded
Gs	Gilpin silt loam, 30-40 percent slopes
Gt	Gilpin silt loam, 30-40 percent slopes, severely eroded
Gu	Gilpin silt loam, 40-65 percent slopes
Gv	Gilpin stony silt loam, 3-10 percent slopes
Gw	Gilpin stony silt loam, 10-20 percent slopes
Gx	Gilpin stony silt loam, 20-30 percent slopes
Gy	Gilpin stony silt loam, 30-40 percent slopes
Gz	Gilpin stony silt loam, 40-65 percent slopes
La	Lickdale silty clay loam, 0-6 percent slopes
Lb	Lickdale stony silty clay loam, 0-15 percent slopes
Ma	Made land
Mb	Mine dumps
Mc	Melvin silt loam
Md	Mixed alluvial land
Me	Monongehela silt loam, 0-10 percent slopes
Mf	Monongehela silt loam, 10-20 percent slopes
Pa	Philo silt loam
Pb	Pope fine sandy loam, 0-6 percent slopes
Pc	Pope gravelly silt loam
Pd	Pope silt loam
Ra	Rayne silt loam, 3-10 percent slopes
Rb	Rayne silt loam, 3-10 percent slopes, severely eroded
Rc	Rayne silt loam, 10-20 percent slopes
Rd	Rayne silt loam, 10-20 percent slopes, severely eroded
Sa	Sequatchie fine sandy loam, 0-3 percent slopes
Sb	Shelocta silt loam, 3-10 percent slopes
Sc	Shelocta silt loam, 10-20 percent slopes
Sd	Shelocta silt loam, 20-30 percent slopes
Se	Strip mine spoil
Ta	Tyler silt loam, 0-6 percent slopes
Ua	Upshur silty clay loam, 3-10 percent slopes
Ub	Upshur silty clay loam, 10-20 percent slopes
Uc	Upshur silty clay loam, 20-30 percent slopes
Ud	Upshur silty clay loam, 20-30 percent slopes, severely eroded
Ue	Upshur silty clay loam, 30-40 percent slopes
Uf	Upshur silty clay loam, 30-40 percent slopes, severely eroded
Wa	Wharton silt loam, 3-10 percent slopes
Wb	Wharton silt loam, 3-10 percent slopes, severely eroded
Wc	Wharton silt loam, 10-20 percent slopes
Wd	Wharton silt loam, 10-20 percent slopes, severely eroded
We	Wharton silt loam, 20-30 percent slopes
Wf	Wharton silt loam, 20-30 percent slopes, severely eroded

Soil surveyed 1946-1955 by Joseph D. Ruffner, Merril Kunkle, Lester E. Espy, David C. Taylor, Soil Conservation Service, U. S. Department of Agriculture. Correlation by Arnold J. Baur, Soil Conservation Service.

Soil map constructed in 1957 by Cartographic Division, Soil Conservation Service, USDA, from 1953 aerial photographs. Controlled mosaic based on polyconic projection, 1927 North American datum.

FAYETTE COUNTY

PENNSYLVANIA

N

Lake of the Woods

(Sheet 2)

Sand Springs

MONONGALIA COUNTY

G R A N T

(Sheet 5)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

2

N

FAYETTE COUNTY

PENNSYLVANIA

East View Church

St. Peters Church

White School

Lake of the Woods

Laurel

Patterson

Hazel

Big Sandy Creek

GRANT

(Sheet 1)

(Sheet 3)

(Sheet 6)

0 1/2 1 Mile

Scale 1:20 000

0 5000 Feet

FAYETTE COUNTY

PENNSYLVANIA

N

(Sheet 2)

(Sheet 4)

(Sheet 7)

GRANT

Clifton Mills

Salem School

Big Sandy Creek

Little Sandy Creek

Glade Run

Ab Run

Barnes

0 1/2 1 Mile

Scale 1:20000

0 5000 Feet

4

N

(Sheet 3)

FAYETTE COUNTY

PENNSYLVANIA

MARYLAND

GARRETT COUNTY

Five Forks

Wrights

Glade Farms

FORT MORRIS

SICKLE HILL

North Avenue School

Glade Run

Ram Run

Thomas Ridge

Hog Run

Cherry Run

(Sheet 8)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

This map is one of a number of sheets prepared by the U. S. Department of Agriculture, Soil Conservation Service, for the soil survey report of this area.

(Sheet 1)

5

N

CHESTNUT RIDGE

MONONGALIA COUNTY

GRANT

Little Laurel Run

Scott Run

Bar Run

Pisgah

(Sheet 6)

(Sheet 9)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

6

(Sheet 2)

N

(Sheet 5)

(Sheet 7)

(Sheet 10)

Hopewell

GRANT

PLEASANT

Laurel Run

Little Laurel Run

Laurel Run

Run

Hazel Run

Run

Run

BIG SANDY CREEK

LITTLE SANDY CREEK

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

This map is one of a number of sheets prepared by the U. S. Department of Agriculture, Soil Conservation Service, for the soil survey report of this area.

(Sheet 3)

(Sheet 6)

(Sheet 8)

(Sheet 11)

N

Brandonville

Bruceton Mills

GRANT

PLEASANT

PLEASANT

Clade Run

Pa CREEK

SANDY

BIG

Sandy Creek

Buffalo Run

SANDY CREEK

LITTLE

Little Sandy

Dipper Run

0 ½ 1 Mile

Scale 1:20000

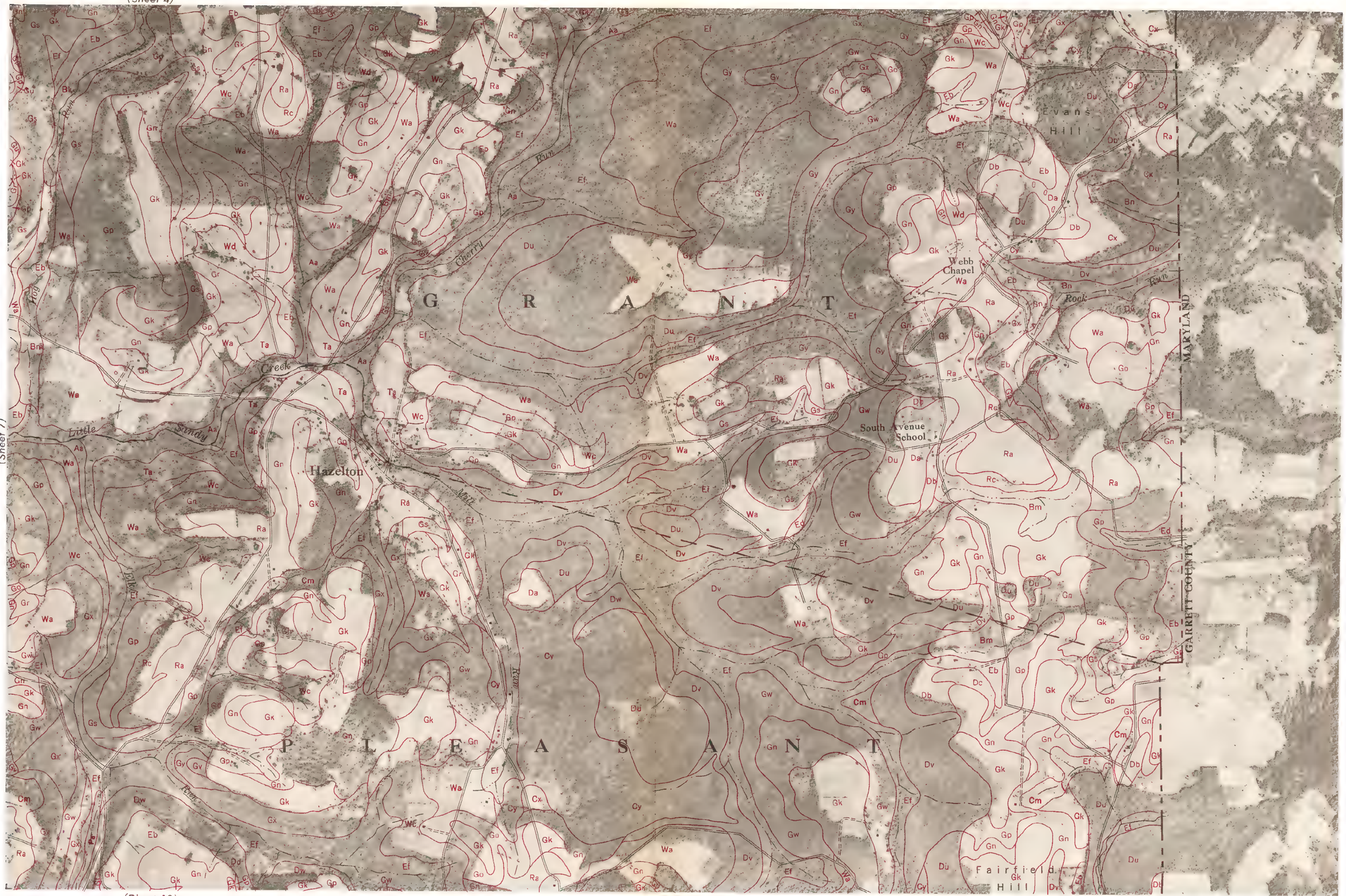
0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(Sheet 4)

N

(Sheet 7)



(Sheet 12)

0 1/2 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 5)

N

GRANT

VALLEY

PLEASANT

MONONGALIA COUNTY

Scott Run

Christopher Run

Bee Run

Big Run

Beech Run

Gibson Run

CHEAT RIVER

SANDY CREEK

BIG SANDY CREEK

Friendship School

(Sheet 10)

(Sheet 14)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(Sheet 6)

(10)

N

GRANT

PLEASANT

Rockville

Mt Nebo

Hudson

Gibson

(Sheet 9)

(Sheet 11)

(Sheet 15)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

GRANT

PLEASANT

Little Sandy Creek

Beaver Creek

Kelly Knob

Sugar Valley

Union Grove School

Centenary Church

Cuzzart

Muddy Creek

Muddy Cr

N

(Sheet 10)

(Sheet 12)

(Sheet 16)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(Sheet 8)

N

(Sheet 11)

Fairfield Hill

Lynn Dale School

Pigeon Knob

MARYLAND

GARRETT COUNTY

P L E A S A N T

Mill Run

Buffalo Run

Laurel Run

Beaver Creek

Muddy Creek

(Sheet 17)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

13

N

MONONGALIA COUNTY

V A L L E Y

(Sheet 14)

(Sheet 18)

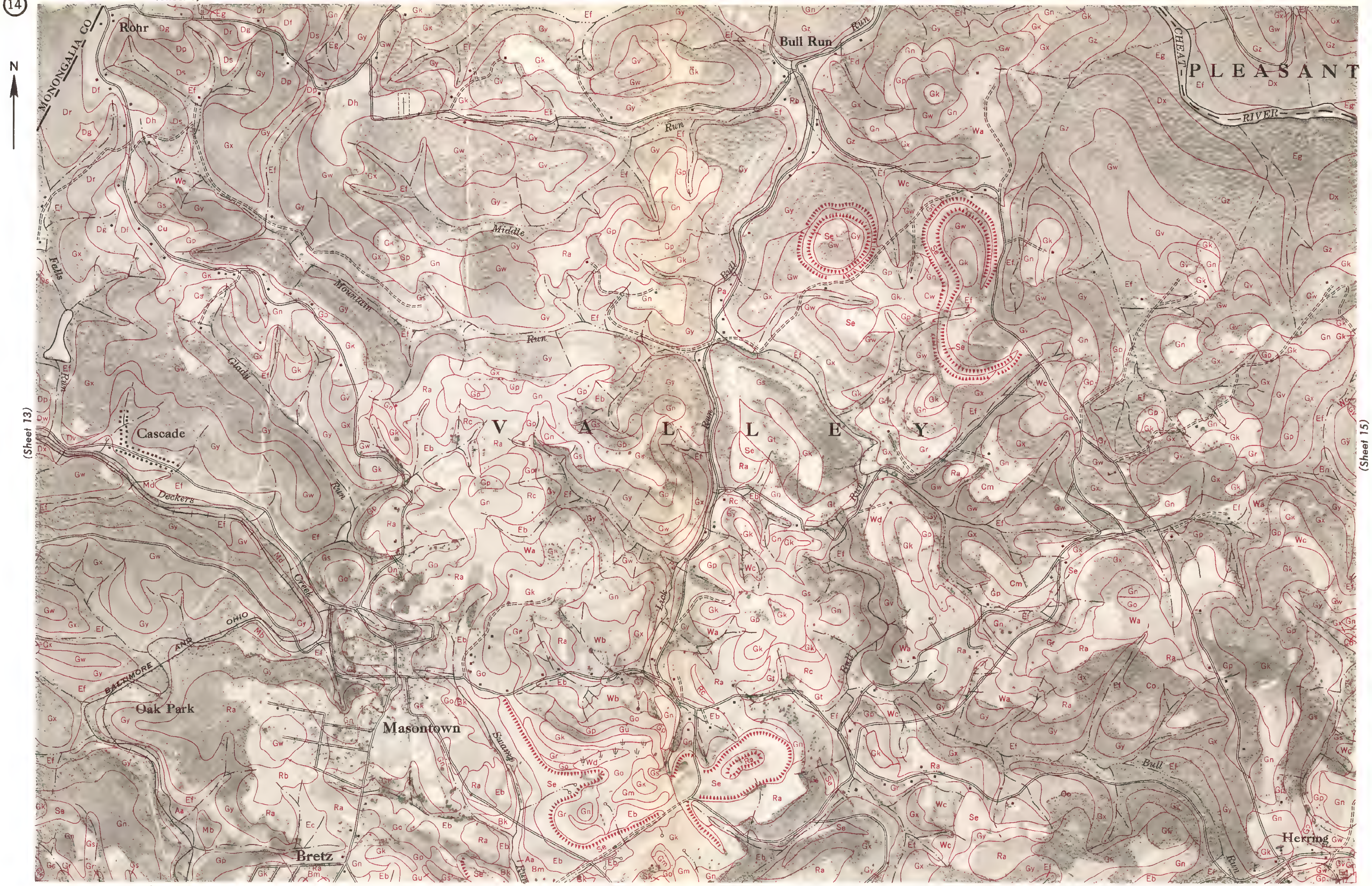
0 1/2 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 9)

(Sheet 13)



(Sheet 15)

(Sheet 19)

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

This map is one of a number of sheets prepared by the U. S. Department of Agriculture, Soil Conservation Service, for the soil survey report of this area.

(Sheet 10)

N

(Sheet 14)

(Sheet 16)

PLEASANT

VALLEY

CHEAT RIVER

Raun

Hacketbarney

Glade

Martin Creek

Sypolt

Dam

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 20)

(Sheet 11)

N

Valley Point

Guseman

Center School

Lenox

Crab Orchard Church

Lick Run School

Wesley Chapel

P L E A S A N T

P O R T L A N D

Maidy Creek

Grade Creek

Martin Creek

Lick Run

(Sheet 15)

(Sheet 17)

(Sheet 21)

0 ½ 1 Mile

Scale 1:20 000

0 5 000 Feet

This map is one of a number of sheets prepared by the U. S. Department of Agriculture, Soil Conservation Service, for the soil survey report of this area.

(Sheet 16)

(Sheet 22)

0 1/2 1 Mile Scale 1:20000 0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(18)

(Sheet 13)

N

MONONGALIA COUNTY

VALLEY

Mt Vernon

Zinn Chapel

Laurel Run

Dockers Creek

Dockers Creek

(Sheet 19)

(Sheet 23)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

This map is one of a number of sheets prepared by the U. S. Department of Agriculture, Soil Conservation Service, for the soil survey report of this area.

(Sheet 14)

N

(Sheet 18)

(Sheet 20)

Slabcamp Run

Laurel Run

Deckers Creek

BALTIMORE AND OHIO

Burk

Guseman

Reedsville

Arthundale

Oak Flat School

Swamp Run

Dillon Run

Kanes Creek

Morgan Mines

Kanes Creek

Deckers Creek

BALTIMORE AND OHIO

Creek

KINGWOOD

Greens Run

V A L L E Y

0 1/2 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 24)

PRESTON COUNTY, WEST VIRGINIA

(Sheet 15)

N

(Sheet 19)

(Sheet 21)

(Sheet 25)

HOGBACK RIDGE

VALLEY

PLEASANT

KINGWOOD

LONG HOLLOW

CHEAT RIVER

Sutherland

Pleasantdale

Laurel Run

Beech Run

Spruce Run

Greens Run

Muddy Creek

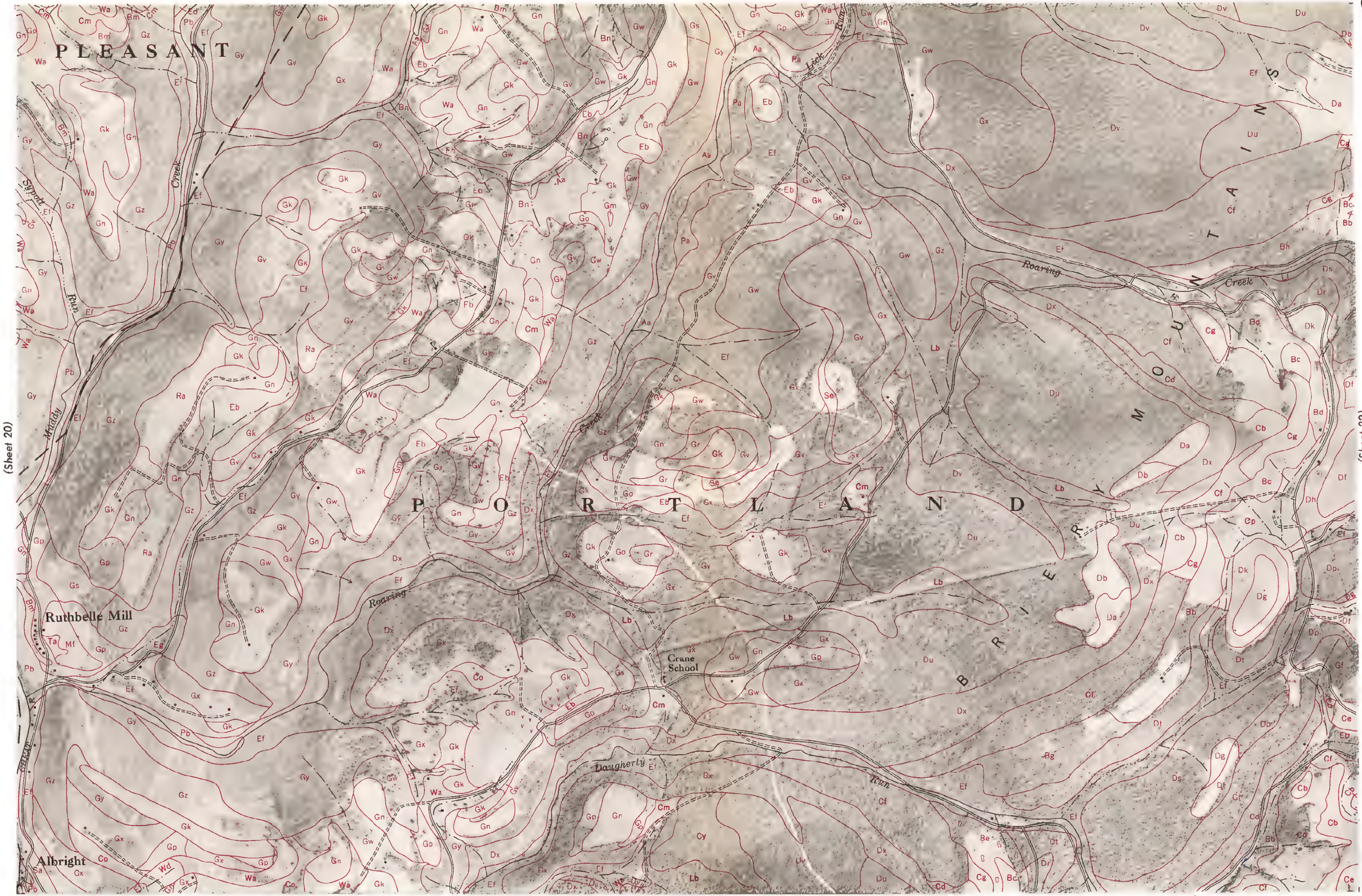
Baltimore and Ohio

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 16)



22

(Sheet 17)

N

(Sheet 21)

Afton

Muddy Creek

BRIERY MOUNTAINS

Roaring Creek

Hoyes Run

Hoyes Run School

Aa Run

Cupp Run

Browning Run

Pine Swamp Run

Muddy Creek

Oak Springs Run

White Oak Run

GARRETT COUNTY

MARYLAND

SNAGGY MTN

P O R T L A N D

Dority

Gregg Knob

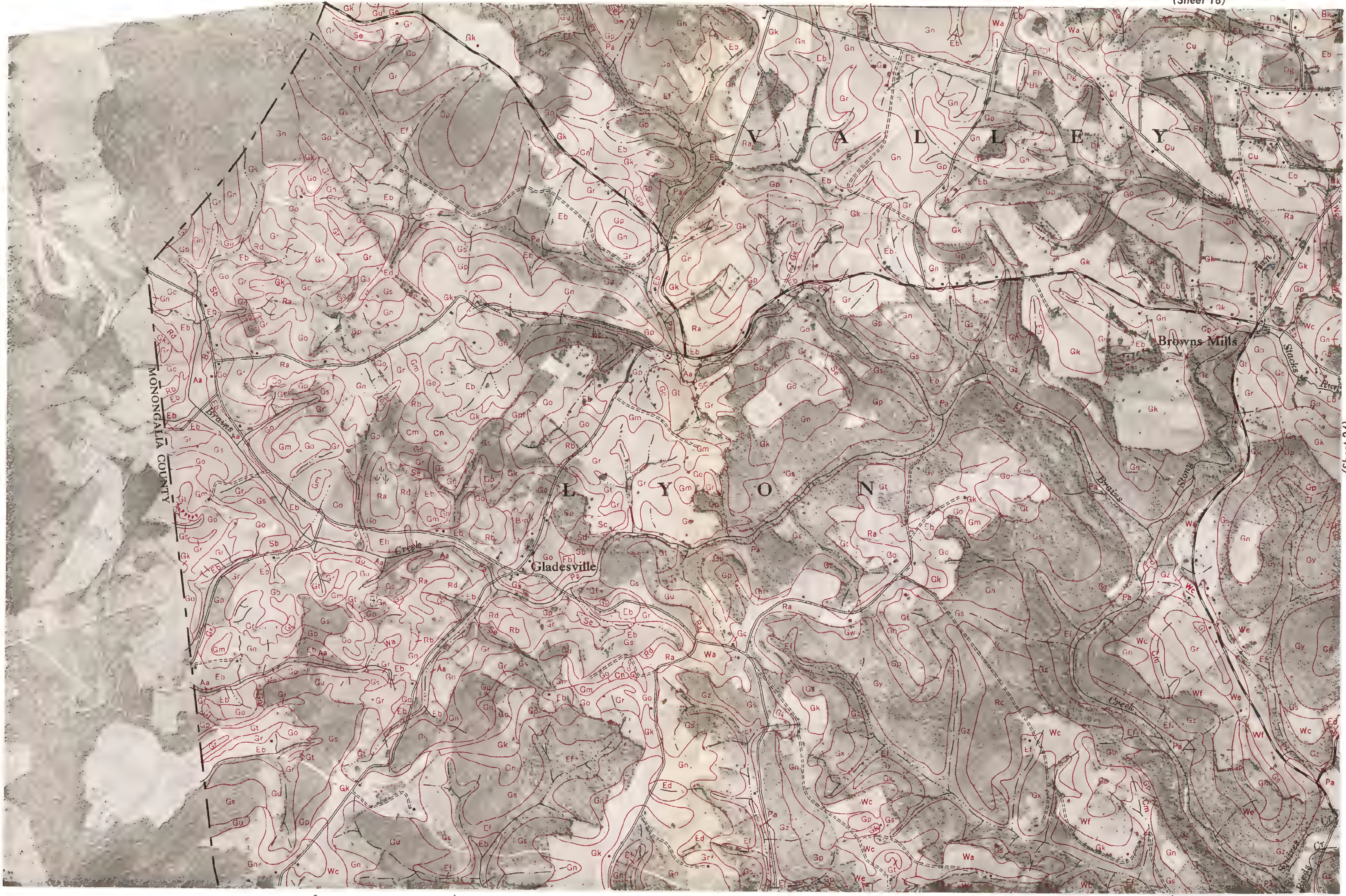
(Sheet 27)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

This map is one of a number of sheets prepared by the U. S. Department of Agriculture, Soil Conservation Service, for the soil survey report of this area.



0 ½ 1 Mile Scale 1:20000 0 5000 Feet

(Sheet 28)

24

N

(Sheet 19)

Arthurdale

VALLEY

Bethlehem Church

Mt Phoebe

Manown

Morgan Run

Run

Smacks Creek

Squires

KINGWOOD

Pell School

St Josephs Church

LYON

(Sheet 23)

(Sheet 25)

(Sheet 29)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 20)

(Sheet 24)

(Sheet 26)

(Sheet 30)

N

KINGWOOD

Zevely

Snider

Caddell

PORTLAND

Irona

BOTTOM

DUNKARD

Scale 1:20000

0 ½ 1 Mile

0 5000 Feet

(Sheet 21)

N

(Sheet 25)

(Sheet 27)

(Sheet 31)

Albright

KINGWOOD

PORTLAND

BRAYMONT

MOUNTAINS

BALTIMORE AND OHIO

CHEAT RIVER

Daugherty Run

Etsey Run

Ashpole Run

Kingwood Reservoir

Raymond Run

Messenger School

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 22)

N

(Sheet 26)

Whiteoak Springs

Daugherty Run

Snowy Creek

North Branch

Lake Terra Alta

PORTLAND

MARYLAND

SNAGGY MOUNTAIN

GARRETT COUNTY

BALTIMORE AND OHIO

(Sheet 32)

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

(Sheet 23)

N

MONONGALIA COUNTY

TAYLOR COUNTY

Martins Run

THREEFORK CREEK

Laurel R

Victoria

Cooks Run

Trout Run

L Y O N

(Sheet 29)

(Sheet 33)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 24)

(Sheet 28)

(Sheet 30)

(Sheet 34)

N

Boardman

Howesville

Irish Ridge School

Oriole

Jessop

Towson

Camp

Birds Creek

Birds Creek

Mack

Town

K I N G W O O D

L Y O N

WEST VIRGINIA

NORTHERN

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 25)

N

(Sheet 29)

(Sheet 31)

(Sheet 35)

KINGWOOD

PORTLAND

Preston

Larew

Trowbridge

Bonnefield School

Camp

Heather Run

Lick Run

Pringle Run

Joes Run

Buffalo Run

Ee Run

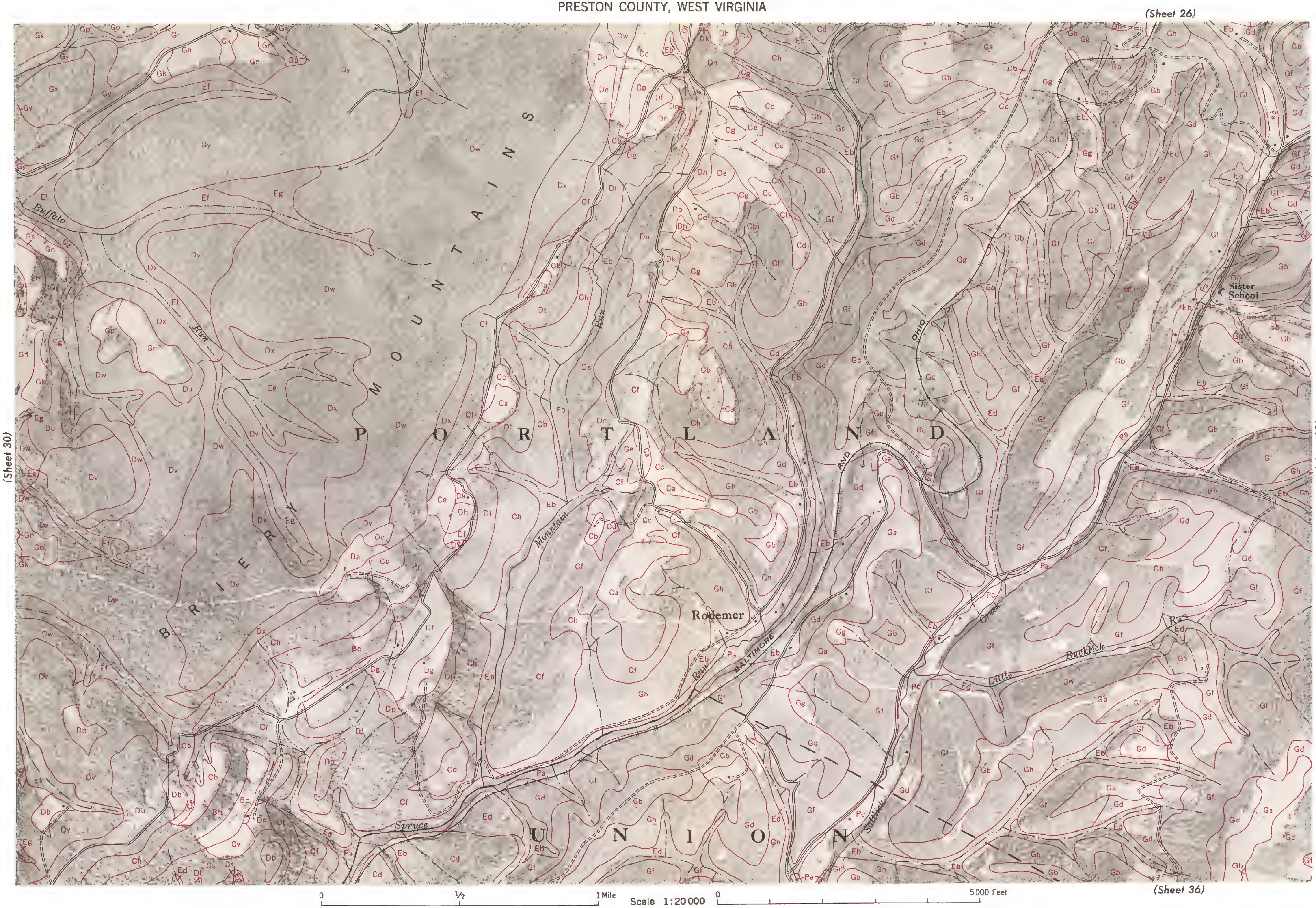
CHEAT RIVER

OHIO AND BALTIMORE

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet


(Sheet 26)
(Sheet 30)
(Sheet 32)
(Sheet 36)
N
BRIERY MOUNTAINS
PORTLAND
UNION
Rodemer
Sister School
BALTIMORE AND OHIO
Buffalo Run
Mountain Run
Little Sandy Creek
Bucklick Run
Spruce Run
Saltlick
Scale 1:20000
0
1/2
1 Mile
0
5000 Feet

32

(Sheet 27)

N

(Sheet 31)

Terra Alta

Hopemont

Holmes

Corinth

SNAGGY MOUNTAIN

Snowy Creek

North Branch

South Branch

Pine Run

Buckhick Run

Little Laurel Run

Laurel Run

Snowy Creek

BALTIMORE AND OHIO

MARYLAND

GARRETT COUNTY

P O R T L A N D

(Sheet 37)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 28)

N

(Sheet 34)

(Sheet 38)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(34)

(Sheet 29)

N

(Sheet 33)

(Sheet 35)

(Sheet 39)

LYON

KINGWOOD

RENO

Hiorra

Austen

Chestnut Ridge School

Shays Church

West End

Denver

Tunnelton

TUNNEL

BALTIMORE AND OHIO

VIRGINIA NORTHERN WEST

Pringle

Little Raccoon Run

Little Sandy Creek

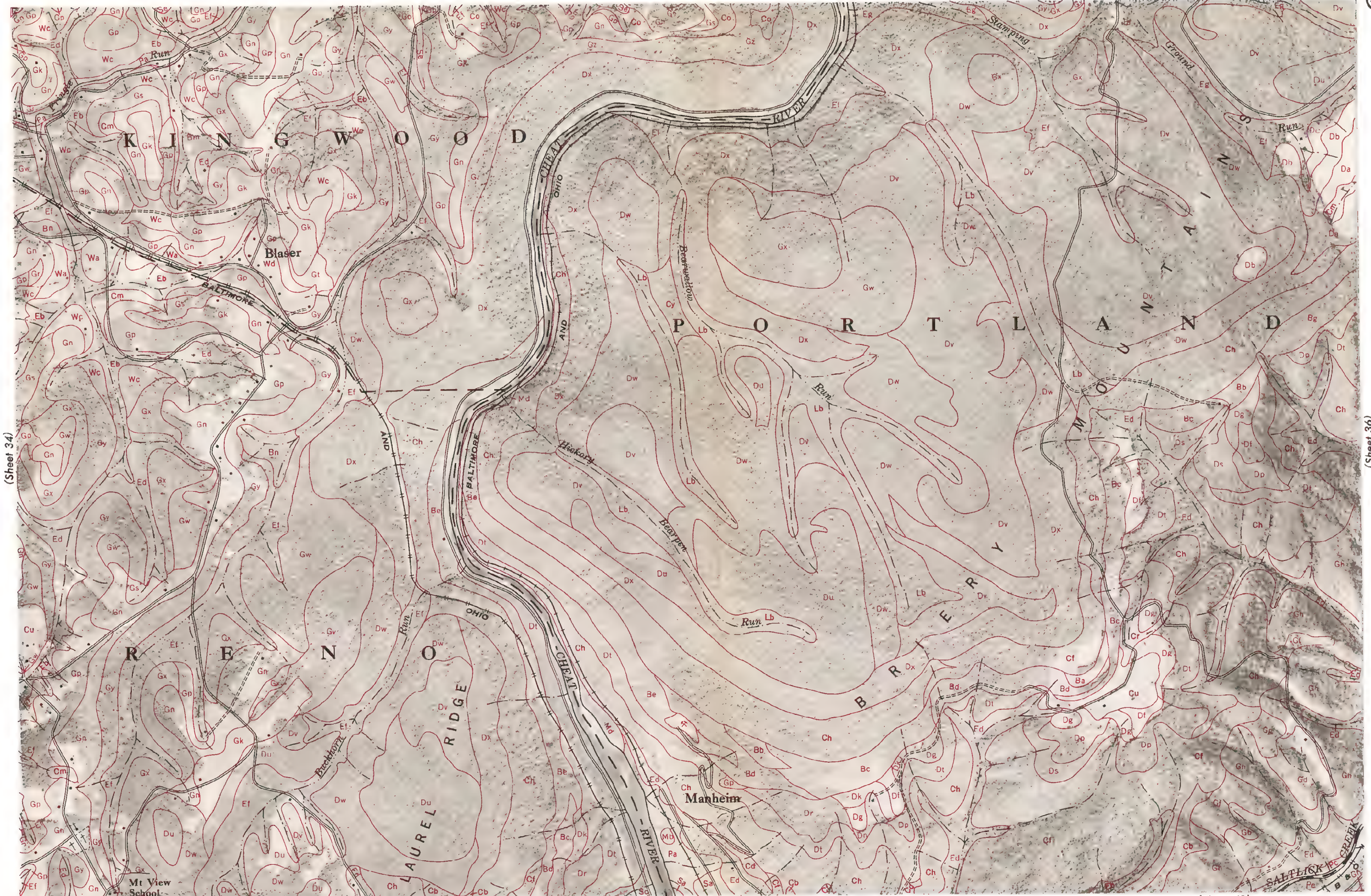
Fork

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 30)



(Sheet 34)

(Sheet 36)

(Sheet 40)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 31)

N

PORTLAND

PORTLAND

Amblersburg

Beatty School

Buckrick

Saltlick Creek

Saltlick

Wolf Run

Spruce Run

Bear Run

Big Run

Kinsinger Run

UNION

(Sheet 35)

(Sheet 37)

(Sheet 41)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

(Sheet 32)

(Sheet 36)

N

P O R T L A N D

U N I O N

Freeport

Turner Douglass

MARYLAND

GARRETT COUNTY

BRUSHY KNOBS

Little Creek

Swamp

Branch

South

Laurel

Bear

Tower

Run

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 42)

(Sheet 33)

N

L Y O N

R E N O

TAYLOR COUNTY

Evansville

Fellowsville

York Run School

Pavilion Church

Brocum Run

Jeffrey Run

York Run

Fork

Sandy Creek

Little Sandy Creek

(Sheet 39)

(Sheet 43)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 34)

(Sheet 38)

(Sheet 40)

(Sheet 44)

N

Sandy Creek

Little Sandy Creek

Left Fork

Right Fork

Little Sandy Creek

Frog Run

Bear Run

Tibbs Run

Flaggy Run

R E N O

Friends Gap

Israel Church

Nazareth Church

50

50

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(40)

(Sheet 35)

N

(Sheet 39)

(Sheet 41)

(Sheet 45)

LAUREL RIDGE

RENNO

PORTLAND

UNION

Saunders School

Burns School

Rowlesburg

Macomber

Cannon Hill

Saltlick Creek

Baltimore and Ohio

CHEAT RIVER

Flag Run

Pheasant Run

Beaver Creek

Madison Run

Scott Run

50

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 36)

N

Bellevue School

Amboy

Mt Olivet

Dayton

U N I O N

L A U R E L R I D G E

Laurel Run

Wolf Creek

Madison

Stone Coal Creek

50

(Sheet 40)

(Sheet 42)

(Sheet 46)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 37)

N

(Sheet 41)

BRUSHY KNOBS

SHAFFER MOUNTAIN

U N I O N

Carmel

Brookside

Aurora

Bretside School

Rhine Creek

Youghiogheny Creek

Mc Creek

Rhine

River

Maple Run

MARYLAND

GARRETT COUNTY

50

(Sheet 47)

0 ½ 1 Mile

Scale 1:20 000

0 5 000 Feet

TAYLOR COUNTY

BARBOUR COUNTY

Little Sandy Creek

Left Fork Buckeye Creek

Sandy Creek

Marquess

Mt Zion Church

RENO

NIGGER HOLLOW

N

(Sheet 44)

(Sheet 48)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(Sheet 39)

N

(Sheet 43)

(Sheet 45)

Stevensboro

Sinclair

School No 16

Left Fork Sandy Creek

Big Sandy

Laurel Run

Little Buffalo Creek

Buffalo Creek

Buckhick Run

(Sheet 48)

(Sheet 49)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

N

Pheasant Run

Wildcat Run

CREEK

RIDGE

R E N O

SINCLAIR

Muddy Run

Etam

BUFFALO

Redhill School

CHEAT RIVER

U N I O N

TUCKER COUNTY

(Sheet 44)

(Sheet 46)

(Sheet 49)

0 1/2 1 Mile

Scale 1:20 000

0 5000 Feet

(Inset, sheet 50)

(Sheet 41)

N

(Sheet 45)

Dayton

Erwin

Hardesty

Grange Hill School

Stemple School

Wolf Creek

Little Sandy Creek

CHEAT RIVER

Panther Run

Bleak Run

U N I O N

M O N O N G A H E L A

N A T I O N A L

F O R E S T

STEMPLE MILL ROAD

(Sheet 47)

(Sheet 50)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 42)

N

Eglon

U N I O N

Accident School

Maple Run

Horseshoe Run

M O N O N G A H E L A

N A T I O N A L

F O R E S T

MARYLAND

GARRETT COUNTY

219

(Sheet 46)

(Sheet 51)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(Sheet 43) | (Sheet 44)

N

R E N O

R I D G E

L A U R E L

Colebank

Sandy Creek

Buffalo Creek

Little Buffalo Creek

BARBOUR COUNTY

TUCKER COUNTY

(Sheet 49)

0 ½ 1 Mile

Scale 1:20 000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(Sheet 44) | (Sheet 45)

49

N

(Sheet 48)

RENO

Sugarcamp Creek

Long Run

Buffalo Creek

TUCKER COUNTY

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

PRESTON COUNTY, WEST VIRGINIA

(Sheet 46)

N (Inset)

U N I O N

White

Thunderstruck Run

Twelve Mile Run

Horseshoe Run

Pc Run

TUCKER COUNTY

(Sheet 51)

U N I O N

TUCKER COUNTY

GRANT CO. WEST VIRGINIA

GARRETT COUNTY MARYLAND

N. Br. Potomac R.

(Sheet 45)

U N I O N

TUCKER COUNTY

Panther Run

(Sheet 50)

(Sheet 51)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet

(Sheet 47)

N

MONONGAHELA NATIONAL FOREST

Breedlove

Silver Lake

Sell School

Slaubaugh School

Leadmile

Youghiogheny River

Wolf Run

Beam Run

Branch

North Branch

South Branch

Hogback

MARYLAND

GARRETT COUNTY

TUCKER COUNTY

BACKBONE MOUNTAIN

(Sheet 50)

(Inset, sheet 50)

0 ½ 1 Mile

Scale 1:20000

0 5000 Feet